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ABSTRACT

Selected articles on various aspects of biology teaching published in 1983 have been annotated in this bibliography. Entries from 25 journals representing 12 countries are presented according to a topic area classification scheme listed at the beginning of the volume. Countries represented include: Australia; Bulgaria; Czechoslovakia; Federal Republic of Germany; France; German Democratic Republic; Hungary; Italy; Poland; Soviet Union; United Kingdom; and the United States. The 15 general topic areas include: didactics of biology as a scientific discipline; history of biology teaching; biology instruction abroad; educational and teaching objectives; biology teaching at general education schools; gnoseological, psychological, and logical foundations of biology teaching; content of biology instruction; didactical principles in biology instruction; methods of biology instruction; biology instruction media; organizational forms of biology instruction; planning biology instruction; outcomes of biology instruction; biology teachers; and articles concerning scientific biology. Each entry, numbered according to a code in the classification scheme, includes author, original title (and English translation when appropriate), complete journal reference, and English abstract. Entries do not necessarily reflect all the topic and sub-topic areas included in the classification scheme. (RT)

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THE DIDACTICS OF BIOLOGY

Selected Bibliography
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DIDACTICS OF BIOLOGY
1983

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1.1 The didactics of biology as a science

1. RIKOV, I.:

Savremenni metodologichni osnovi na didaktikata i oshatnite metodiki (Contemporary methodological foundations of didactics and special methodologies) *biologiya i khimiya*, 26, 1983, No. 1, pp. 22-26.

Those who deal with the methodology of the natural sciences among members of the older generation have a preference for empirical methods in the study of natural phenomena and reject the possibility of learning through words, models, outlines, pictures, etc. They claim that only immediate contact with the original material assures a materialistic approach. In spite of the fact that this stand is not officially postulated, it influences to a large extent the educational work of young teachers. The author for these reasons recommends the study of a philosophical paper called "The Leninist Theory of Reflection and Contemporary Science", written by Todor Pavlov. It shows how a dialectical and materialistic approach can be implemented also through a complex apparatus of symbols and signs, which can also serve as a maximum criterion of validity for human labour. In such cases the idea formulated by K. Marx concerning the transformation of the material into the ideal is fully valid.

natural science, philosophy, biology, science education - Bulgaria. 147313.

1.8 Journals concerning the didactics of biology

2. McCormack, A.J.:

The New ABT: Focus on How-To-Do-It and Bioscience Updates

The American Biology Teacher, 45, 1983, No. 5, p. 262-263.

The didactical journal The American Biology Teacher, published in the USA, is gradually undergoing changes based on the wishes of its readers, specifically science teachers. In 1981 its readers asked that the journal concentrate more on practical school instruction and activities, as well as provide more information on current discoveries and trends in biology as a science. This article represents the stand of the publishers and editors to these requests. The journal will in the future have special sections on school instruction media, practical work in biology, the use of computers and projection centres in classwork and also a special section on new developments in the biological sciences.

didactics of biology - biology instruction - journal - USA. 147323.

3. GERLACH, M.:

Zur Arbeit mit der Fachzeitschrift "Biologie in der Schule" (On working with the specialized journal Biologie in der Schule)

Biologie in der Schule, 32, 1983, No. 2-3, pp. 101-102.

This article stresses the need to improve the quality of instruction through the further education of teachers. The author makes interesting points concerning the need to plan instruction in the form of

thematic units, the need for making the work of hobby clubs more interesting on the basis of various specific topics, etc. The author recommends the creation of a card file by the teacher, where various topics are prepared in advance on the basis of articles from the journal. He describes his own experience in this area.

didactics of biology - biology instruction - journal - card file - GDR. 147323.

3. Contemporary biology teaching and the didactics of biology abroad

4. CICHY, D.:

Założenia programowe nauczania biologii z higieną w osmioletniej szkole podstawowej. (Prerequisites for combining biology instruction and hygiene instruction in eight-year basic schools, from the point of view of curriculum)

Biologia w szkole, 36, 1983, No. 1, pp. 12-13.

The development of biology, new scientific fields, new theories and facts require the modernization of biology instruction in schools. Both the selection and integration of subject-matter are needed. While the existing biology specializations provide basic facts, they are not conducive to the creation of modern thinking in the natural sciences and for achieving an understanding of ecological relations which are fundamental for environmental control. The author discusses in detail the criteria for selecting the subject-matter for teaching biology on the basis

of general didactical criteria, of individual fields of biology, on the basis of organizational criteria, etc. On this basis the author offers sequences of topics where both educational and instructional aims are formulated. Special attention is accorded the learning of specific skills and the forming of correct attitudes and convictions in the course of biology teaching. In conclusion the draft of a combined biology and hygiene teaching syllabus is provided. In the 4th to 7th classes there are two biology lessons weekly and in the 8th class only one. Comments are given on the use of the teaching syllabus in each class.

didactics of biology - biology instruction - basic school - teaching syllabus - 4th to 8th class - Poland. 147307.

5. FAJFUS, B.:

Vývoj přírodovědy v období vědeckotechnické revoluce a přírodovědné vzdělání (The development of the natural sciences in the period of the scientific and technological revolution and an education in the natural sciences)

Přírodní vědy ve škole, 34, 1982-1983, No. 2, pp. 42-45.

The period of developed socialism makes it possible to fully develop the scientific and technological revolution and to implement the findings of science in practical life. In the area of education and teaching, the project of a new educational and teaching system is now being implemented. A basic characteristic of the scientific and technological revolution is its comprehensive nature, as well as changes it has caused in the image of the world as it is formed by the

natural sciences; problems of the leading natural science and its function, trends which exist in the creation of a synthesis within the natural sciences, etc. still require the finding of solutions. For contemporary science the growing role of the biological sciences is very important. A new level of scientific cognition is being created, based on the interaction of various special disciplines: nature conservation and environmental control, as well as ecology can serve as examples. Also border-line areas existing between different science, such as astro-physics or bio-chemistry, are becoming integrated into new sciences. The use of mathematics in natural sciences is another new trait, as well as the use of information theory, cybernetics, decision-making theory, etc. Also the aspect of knowledge of self provided by contemporary science is important, as well as the humanitarian aspect of the scientific and technological revolution. In conclusion the author mentions the tasks which still await us in the scientific and technological revolution.

didactics of biology - biology instruction - scientific and technological revolution - modernization + school system - Czechoslovakia. 147359.

6. GEMEINHARDT, D.:

Zum aktuellen Thema. Höhere Bildungs- und Erziehungs-
ergebnisse in Klasse 8 - für jeden Schüler !

(On a current theme: Improving the educational and instructional results achieved in the 8th grade by each pupil!)

In the academic year 1982-1983 a new concept of instruction in the 8th grade was practically implemented for the first time. A new biology textbook was published, as well as a methodological handbook. Discussions among teachers should now concentrate on problems connected with practical experiences with this new concept. The author mentions several problems which should become the subject of discussions.

didactics of biology - biology instruction - 8th class -
new concept - GDR. 147311.

7. Wstępny projekt programu biologii dla LO o profilu
podstawowym (The introduction of new biology teaching
syllabi for general education secondary schools with a
general curriculum)

Biologia w szkole, 36, 1983, No. 2, pp. 97-102.

The new biology teaching syllabi for general education secondary schools were drafted by the Institute of School Curricula and Syllabi. The syllabi formulate the educational and instructional objectives of teaching, criteria used for the selection of topics for instruction from the point of view of biology as a science, developmental psychology and didactics; from these aspects the subject-matter of biology is divided into various syllabi for each class. Two

weekly lessons of biology are assumed in the 2nd, 3rd and 4th classes.

didactics of biology.- Biology instruction - secondary school - 2nd to 4th class - teaching syllabi - Poland. 147307.

8. Założenia programowe - organizacyjne kształcenia i wychowania w szkole podstawowej (Organizational and curriculum prerequisites for education and instruction in basic school)

Biologia w szkole, 36, 1963, No. 1, pp. 10-11.

The author describes the draft of a new curriculum and teaching syllabi for biology instruction in basic school - both for mandatory and elective parts of the course. Biology is taught in the 1st to 3rd class within the framework of the subject Elementary learning, which is taught for 1 lesson a week in the first class, 2 lesson a week in the 2nd class and 2 lesson a week in the 3rd class. In the 4th to 8th classes biology is taught together with hygiene, in the 4th to 7th class in 2 lessons a week and in the 8th class 1 lesson a week.

didactics of biology - biology instruction - basic school - curriculum - teaching syllabi - 1st to 8th class - Poland. 147307.

3.1 Contemporary biology teaching and the didactics
of biology in the foremost capitalist countries

9. McCONNELL, D.:

Students' construction of a human biology degree
course

Journal of Biological Education, 17, 1962, No. 2,
pp. 143-148.

Lit. 5, 1 fig., 3 tabs.

In the project which the author describes students have the opportunity to construct their own human biology course by choosing among 5 different types of courses which concentrate on human anatomy, bio-chemistry, genetics, physiology and psychology. It was found that they usually chose such a degree of integration which provides an opportunity to achieve a comprehensive knowledge of human biology. The author describes various combinations of courses, their advantages and disadvantages and the findings of various parts of the project concerning how students would choose their courses, when left a free choice. These findings are analysed in detail.

didactics of biology - biology instruction - human
biology curriculum - project to study construction -
USA. 147307.

10. DENNY, M.:
Coming of age of human biology: a study of the birth
and growth of a subject in the school curriculum
Journal of Biological Education, 17, 1983, No. 3,
pp. 215-221.

The author first describes the history of human biology instruction in British schools of higher education and its place in the curriculum. One of the pioneers in this field is London University, whose curriculum and teaching syllabi in this field are described. The author especially discusses the humanization of school biology in secondary schools.

didactics of biology - biology instruction - human biology curriculum - Great Britain. 147307.

11. GOULD, C.D.:
The impact of Nuffield O-level Biology - an agent of
change in biology teaching ?
Journal of Biological Education. 17, 1983, No. 3,
pp. 201-204. Lit. 22, 1 tab.

The article discusses the existing situation as far as the Nuffield O-level biology course taught in schools is concerned. The course was developed in the fifties and was accepted as an alternative for dealing with the problem of modernizing biology instruction in general. Its full name is the Nuffield Ordinary Level Biology Project. At present teachers have already accumulated various critical stands towards the Project and are asking for the introduction of some changes. Among the aspects of the project which are criticised are its high financial cost, the need for large quantities of material which is sometimes difficult

to obtain and some problems in the organization of instruction at the secondary level. Also the problem of examinations is discussed and changes in the teaching syllabi used, relations towards other teaching subjects and the work of the teacher.

didactics of biology - biology instruction - curriculum - teaching syllabi - modernization - Great Britain.
147307.

12. HANSEN, H.O.:

Edukacja środowiskowa w Danii (Education for environmental control in Denmark)

Biologia w szkole, 36, 1983, No. 3, pp. 155-160.

1 tab.

Denmark is a country with a almost entirely man-made landscape. There are only several localities where a really natural environment remains intact. In 1973 a Ministry of Environmental Control was established in Denmark and this subject was also included into school curriculums in the middle of the seventies. This ministry oversees the planning of interventions into the environment, measures the pollution of the environment, safety measures connected with atomic power stations, sets standards for food, carries out practical measures in nature conservation and the conservation of historical monuments, registers the depletion of natural resources, forestry developments and other factors in the landscape. The article also describes the role of environmental control in the school curriculum of various types of schools. The most important part of this subject-matter is concentrated in biology instruction, but it is not the only subject where these

problems are taught. The author also discusses teacher training from the point of view of the subject of environmental control. In conclusion the activities of various societies and associations in this area are discussed, as well as the role of public opinion.

didactics of biology - biology instruction - environmental control - nature conservation - Denmark. 147307.

4. Educational and teaching objectives and the tasks of biology instruction

13. HARTUNG, M.:

Die Gestaltung von Feilzielkatalogen im Biologieunterricht - ihre Nutzung für die Bestimmung des wesentlichen Stoffes (Creating catalogues of objectives in biology instruction - their significance for determining basic subject-matter for teaching)

Biologie in der Schule, 12, 1963, No. 6, pp. 238-240. 1 tab.

A clear objective in education and teaching is very important for the planning and actual implementation of instruction. But experiences indicate that in this respect teachers require help, especially as far as planning the activities of pupils are concerned. One of the methods available for the correct interpretation of the teaching syllabus in this context is the creation of a catalogue of objectives for individual classes. These catalogues contain partial educational and instructional objectives and the outcome which is to be achieved according to the teaching

syllabus. When creating the catalogue it is of course necessary to first define basic subject-matter for teaching. The author provides the example of such a catalogue for the 6th class.

didactics of biology - biology instruction - educational and teaching objectives - basic subject-matter - GDR. 147307.

5.3 Specific aspects of biology instruction at specialized and vocational schools

14. LUKYANOVA, B.M..

Chemu uchast v selektsionno-professionalno-tekhnicheskikh uchilishchakh (What is taught in rural technical-vocational schools)

Biologiya v shkole, 57, 1983, No. 4, pp. 16-20.

The author provides information on the curriculum in vocational technical schools which train qualified workers for the national economy, specifically for agriculture. This type of training is provided by a uniform system of education, tailored to the needs of that branch of the economy for which it is specialized. The rural vocational schools described in the article offer various specializations such as mechanization of agriculture, animal husbandry, crop production, etc. Besides these specializations the schools also provide a general education; in this context biology is especially important. Pupils learn about evolutionary theory, genetics, ecology, etc. Work in laboratories, on school plots of land and labour training in agri-

culture are taught within the framework of vocational training subjects which provide training in agriculture. The pupils also make their own contribution to the Food Program of the USSR by cultivating and breeding their own agricultural products which provide food for their school dining room. These schools and training centres are improving and modernizing their equipment, including instructional media. Graduates work on state farms and collective farms where they receive special aid in the period immediately after taking up the job. In conclusion the editors have added the requirements for acceptance to these schools and a list of these schools and their addresses in the USSR.

vocational choice - secondary vocational schools -
biology instruction - teaching syllabus - curriculum -
agricultural schools - USSR, 147307.

5.9 Elective biology instruction in general education schools

15. BREMER, H.:

Hinweise zur Durchführung des Fakultativen Lehrgangs
"Bau und Leistungen von Zellen, Geweben und Organen"
(Teillehrgang 3) (Instructions for teaching an
elective course on the "Structure and Functions of
Cells, Tissue and Organs" - part 3)
Biologie in der Schule, 32, 1963, No. 12, pp. 484-489,
1 fig.

The third installment of a methodological paper concerning the concept of elective biology courses is

devoted to the dissection of a mammal (a guinea pig) and the observation of animal tissue - the structure of the epithelium, connective ligaments, cartilage, bone tissue and stained blood smear, skeletal muscles, ganglion cells and large chromosomes.

didactics of biology - elective course + biology - general biology-dissection + mammal - laboratory work, GDR. 147313.

16. BRUSSIG, R. - BRUSSIG, S.:

Erfahrungen aus der Arbeit eines fakultativen Kurses "Mikrobiologie" (Experiences with an elective course on microbiology)

Biologie in der Schule, 32, 1983, No. 12, pp. 489-493.

On the basis of the cooperation which exists between an agrochemical plant and the University at Halle, agrochemicals have been tested, with special stress on the effect of the chemicals on micro-organisms. A biology hobby club from a secondary school also participated in the project. The authors describe the course of nine two-hour periods during which pupils participated in the testing of the chemicals and also discuss the further work of the hobby club and the opportunity to use the findings of the project in the normal biology course.

didactics of biology - elective course + biology - microbiology - agricultural chemicals - hobby club - GDR. 147313.

17. EISENHÄBER, P.:

Zur methodisch-technischen Durchführung des fakultativen Lehrgangs "Bau und Leistungen von Zellen, Geweben und Organen" (Grundlehrgang und Teillehrgang 1)
(Concerning the methodological and technical implementation of an elective course on the "Structure and Function of Cells, Tissues and Organs" - basic course and part 1)
Biologie in der Schule, 12, 1983, No. 7-8, pp.302-306.
1 fig.

A new teaching syllabus for an elective course called "The Structure and Functions of Cells, Tissues and Organs" has been in use since September 1st, 1983. The purpose of this three-part paper is to provide instructions for selected observations and experiments which specifically develop pupils' activities. First the course as a whole is described and then various observations and experiments on the subject "Selected Problems of the Biochemistry of Plant Cells and Tissues" which include for instance proof of the presence of amylase, measuring catalase activity, quantitative measurements of starch, sugar reduction and the observation and measurement of respiration.

didactics of biology - biology instruction - elective courses - cell - organ - observation - experiment -
GDR. 147313.

18. ZABEL, E.:

Zur Einführung des überarbeiteten Planes für den fakultativen Lehrgang "Bau und Leistungen von Zellen, Geweben und Organen" (On using the restructured teaching syllabus for an elective course "The Structure and Function of Cells, Tissues and Organs")
Biologie in der Schule, 32, 1983, No. 4, pp. 157-164.
1 tab.

With changes in the teaching syllabus for the normal biology course, changes are also occurring in the concept of elective courses whose main purpose is to prepare pupils for study at an institution of higher learning. The new syllabus for an elective course on the "Structure and Function of Cells, Tissues and Organs" will become effective on September 1st, 1983 while the syllabus for a course called "Ecology" will be available from 1985 onward. The author analyses the objectives of the new teaching syllabus and describes the methods and procedures which it contains and the axiological aspects which it stresses. Also the inner structure of the syllabus is discussed. In the 11th class there are 75 lessons and in the 12th class 35 teaching lessons available. In elective courses the role of the teacher should be above all that of a supervisor and advisor, pupils should work independently for extended periods of time. From the point of view of organizational forms of instruction, the author stresses group instruction. Also various instructions concerning experimental material and various technical media required for the experiments are discussed.

didactics of biology - biology instruction -
elective courses - teaching syllabus - laboratory
work - GDR. 147307.

6.1 The forming of biological notions and terminology

19. PARENBERGER, G.:

Einführung der Begriffe "Energie" und "Arbeit"

(Learning the notions "energy" and "labour")

Naturwissenschaft im Unterricht - Biologie, 31, 1963,
No. 9, pp. 312-319.

Lit. 6, 3 worksheets, 2 figs., 1 tab., 6 photos.

The author describes simple experiments done on apparatus which can be constructed from science kits, which concern the notion of energy and labour. Pupils study phenomena connected with the accumulation of energy and its transformation and on the basis of technical analogies, which are then applied to living organisms.

didactics of biology - biology instruction - learning notions + energy + labour - FRG. 147313.

20. LEPEL, W.D.:

Zum aktuellen Thema. Vorschlag zur Begriffsbildung in der Stoffeinheit "Stoff- und Energiewechsel" (Klasse 8)

(On a current theme: Suggestions for learning the notions found in the topic Metabolism, taught in the 8th class)

Biologie in der Schule, 32, 1982, No. 9, pp. 353-356.
4 figs.

Practical experience indicates that especially in the 8th to 10th classes it is necessary to devote increased attention to pupils' learning of basic terms and notions and their mutual relations. Biological notions in taxonomic subject-matter such as nutrition,

digestion, metabolism cannot, however, be formed in this way. Instruction should include an understanding of the place of these notions in already known relations, by making use of knowledge already gained previously, by clearly explaining the relevant terms, demonstrating their specific aspects and their application, etc. This makes it possible to use deduction on the basis of previously learnt theoretical knowledge. The author describes in detail how a term is made increasingly more specific on the basis of selected examples concerning the functioning of a metabolism and a definition of life.

didactics of biology - biology instruction - Learning notions - metabolism - 8th class - basic school - GDR. 147313.

21. JENÍK, J.:

Terminologický slovníček (A terminological glossary)
Přírodní vědy ve škole, 34, 1982-1983, No. 3, pp.89-90.

In this entry the ecological notion of population is defined, including the terms population size, biotic potential, resistance of environment, increase in human population.

biology - ecology - terminology - Czechoslovakia. 147319.

22. JENÍK, J.:

Terminologický slovníček XXIV (Terminological glossary No. 24)

Přírodní vědy ve škole, 34, 1982-1983, No. 4, pp. 131-132.

This ecological entry deals with the production and quantity of biomass created on a specific area in a specific period of time; the primary production of green plants, photosynthesis, secondary production (by bacteria and animals) and the net production of the ecosystem are all explained.

biology - ecology -terminology - Czechoslovakia.
147319.

23. JELÍNEK, J.:

Terminologický slovníček XXV (Terminological glossary No. 25)

Přírodní vědy ve škole, 34, 1982-1983, No. 5, p. 172.

In this entry the topic is nature, which is defined as the sum of everything which did not and does not develop on the basis of human activity; in other words the landscape outside human settlements and communications. The term is discussed as a counterpoint to culture and an urban environment.

biology - ecology - terminology - Czechoslovakia.
147319.

24. JENÍK, J.:

Terminologický slovníček XXVI (Terminological glossary No. 26)

Přírodní vědy ve škole, 34, 1982-1983, No. 6, pp.202-210.

This entry concerns the soil. It is defined as the substrate on which plants can grow, as well as a

natural formation, which has developed as the result of the weathering of surface rocks in the crust of the Earth, to which organic waste of micro-organisms, plants and animals has been added. The soil is distinguished from earth. The author also describes the classification of soils, soil horizon, the composition of the soil, the circulation of nutrients in nature and in the soil, the chemical composition of the soil, and the soil as a component of a natural eco-system.

biology - ecology - terminology - Czechoslovakia.
147319.

25. JENÍK, J. - MOLDÁN, B.:

Terminologický slovníček XXVII (Terminological glossary No. 27)

Přírodní vědy ve škole, 34, 1982-1983, No. 7, p. 249.

The terms "regimen" and "selfcleansing" are explained. A regimen is a complex expression of the relation to permanent or periodical physical factors. Most frequently regimens are classified according to some dominant factor; often the meaning of "regimen" approaches other terms, such as balance, conditions, course, etc. Frequently used are micro-climate regimen, hydro-pedological regimen, water regimen, light regimen and thermal regimen. Selfcleansing occurs in the soil, in water, in the air and among plants, and includes chemical, physical and biological processes. The selfcleansing properties of a stream are described in detail.

biology - ecology - terminology - Czechoslovakia.
147319.

26. JENÍK, J.:

Terminologický slovníček XXIX (Terminological
glossary No. 29)

Přírodní vědy ve škole, 34, 1982-1983. No. 9, pp.331-332.

This entry deals with the notion of community. It is defined as a sum of organisms which live in a common area and influence each other. At first a community is subject to succession but in its further development more or less closed plant and animal communities develop, which form a biocoenoses. The basic unit in a phytocoenoses is a plant association. An association can be grouped into a syntaxon of a higher order.

biology - ecology - terminology - Czechoslovakia.
147319.

27. JENÍK, J. - MOLDÁN, B.:

Terminologický slovníček XXX (Terminological
glossary No. 30)

Přírodní vědy ve škole, 34, 1982-1983, No. 10,
pp. 369-370.

The article deals with the terms "stress" and "territorial planning". Stress is a state in which the living organism mobilizes its defence and/or corrective mechanism after it has been deflected from a state of equilibrium. It can also be defined as a set of factors which disturb a stabilized condition in a living organism. Territorial planning concerns the planning of investments as well allocation of productive and other human activities within the framework of a specific area (landscape). Territorial planning makes decisions on the specific place

a factory, communication sytem, engineering work, extraction project or other investment will have in the landscape. It assures harmony between the ecological aspect and the social zone, both in production and elsewhere.

biology - ecology - terminology - Czechoslovakia.
147319.

28. MOLDÁN, B.:

Terminologický slovníček XXVIII (Terminological glossary No. 28)

Přírodní vědy ve škole, 34, 1962-1963, No. 8,
pp. 289-290.

The terms "smog" and "fallout" are explained. Smog develops from solid or liquid aerosol particles which develop directly in the atmosphere from originally gaseous components ~~in~~ the atmosphere. Various types of smog exist, the most famous are the London type and photochemical smog in Los Angeles. The amount of fallout is an ~~indicator~~ indicator of air pollution; its maximum values are 150 tons per square kilometer annually. Fallout includes all solid particles which fall to the ground. Radioactive fallout from nuclear explosions is especially dangerous.

biology - ecology - terminology - Czechoslovakia.
147319.

29. SCHLEEVOIGT, H.:

Hospitiert und notiert. Einführung des Begriffes
"Toleranzbereich" am Beispiel des Wasserfaktors

(Noted on the basis of classroom visits by school supervisors: Learning the notion of a "tolerance area" on the basis of the example of water)

Biologie in der Schule, 32, 1973, No. 2-3, pp. 98-99.

In the Apolda district, visits to classrooms by school supervisors have discovered very good methods for making use of school experimental plots of land used to teach various biological and ecological notions. For instance the notion of the role of water in the growth of plants can be learnt in experiments where pupils provide lettuce plants with various amounts of water, while temperature and soil composition are constant. In the classroom these experiments are supplemented by using the textbook.

didactics of biology - biology instruction - learning notions - visits to classrooms - GDR. 147313.

6.4 Teaching pupils basic scientific methods used in
biology and acquainting them with school biology
technical media

30. KNEY, D.:

Hilfen für das Lösen von Aufgabe (Help in solving problems)

Biologie in der Schule, 32, 1983, No. 11, p. 440.

Pupils are often incapable of solving problems because they do not understand them and/or do not

know what kind of activity will lead to their solution. For this reason the biology teaching subject committee at the school where the author teaches drew up instructions for the use of various specific activities such as observations, the use of definitions, making comparisons, finding proof, etc. Each pupil obtains these instructions; their use in class work was found to bring positive result.

didactics of biology - biology instruction -
scientific methods + application in class - GDR.
147313.

31. STAWIŃSKI, W. - SAWIŃSKI, J.P.:

Kształtowanie umiejętności i zainteresowań biologicznych (The forming of biological skills and interests)

biologia w szkole, 36, 1963, No. 2, pp. 87-97.
Lit. 32, 1 tab., 5 figs.

One of the basic tasks of the didactics of biology is to study the course of instruction, as well as rationalization methods implemented in teaching and learning, optimalization mechanisms for acquiring basic knowledge and skills and learning biological terms, notions and skills. The author here describes the skills which are required for learning biology, assesses them according to various criteria, describes their structure, etc. He also distinguishes general skills and special skills and theoretical (mental) skills and practical skills. Each biological skill is a complex which contains various partial activities. The author also describes the activities of the teacher and the pupil when the latter is learning

some skill pertaining to biology. He goes^{on} to comment the psychological and didactical foundations of learning skills.

didactics of biology - biology instruction - learning skills - activity + pupil, Poland. 147313.

6.7 Guiding pupils towards the use of successful learning methods in biology. Activation of pupils, self-control of pupils. Pupils interests.

32. Hearing Impairment / Career Impairment. A Science Career Workshop Can Give Deaf Students the Encouragement They Need to Pursue a Vocation in Science
The Science Teacher, 50, 1983, No. 9, pp. 23-25.
Lit. 2, 1 photo.

The author show how through an individual approach to students with impaired hearing it is possible to compensate their handicap and to help them in making a good vocational choice based on studying science.

didactics of biology - biology instruction - hearing impairment - individual approach to pupil - pupil interest - USA. 147309.

6.7.2 The education of logical thinking in biology
instruction - logical procedures

33. ALTMANN, A.:

Strukturace a didaktická analýza učiva ve výuce
biologie (The structuralization and didactical
analysis of the subject-matter taught in biology
instruction)

Přírodní vědy ve škole, 34, 1982-1983, No. 9, pp.323-325.

The learning of biological terms is necessarily linked to various logical procedures, such as analysis, synthesis, induction, deduction, comparisons, abstractions, concretizations, generalizations, classifications, systemizations and structuralization. All of these but the final two are used when learning new biological notions and terms; the latter two are used for the strengthening of newly learnt terms, their combination into larger or smaller structures and also their combination with terms and notions learnt in other teaching subject (interdisciplinary relations). In the course of structuralization the terms learnt previously or those newly learnt are combined into structures, microstructures or macrostructures which usually pertain to a specific field of biology or combine biological terms with those from physics, chemistry and other sciences. Structuralization puts into mutual relationships various terms and notions, stresses for instance sequences, subordination or co-ordination. Microstructures and macrostructures demonstrate relations between terms, which can include for instance morphological and anatomical, physiological, ecological development

or historical terms. Especially in lessons devoted to repetitions and summing up, structuralization has an important role to play. Structures can be closed (are not linked to structures of other terms) or open (are linked to other structures). The author describes his own methods of implementing these logical procedures in the course of teaching. The term "didactical analysis of teaching subject-matter" is closely linked to the problem of structuralization because it carries out a spontaneous structuralization of notions which are connected with newly taught terms.

didactics of biology - biology instruction - learning terms - logical procedures - structuralization + terms - Czechoslovakia. 147307.

34. BRECHTSCHNEIDER, J.:

"Überlegungen zur Entwicklung des Systemdenkens der Schüler im Biologieunterricht der Klassen 9 und 11 (II)."

(Considerations on the development of system thinking in pupils in the course of biology instruction in the 9th to 11th classes - part II.)

Biologie in der Schule, 32, 1983, No. 1, pp. 42-45.

The teaching syllabus devotes a great deal of attention to the system thinking of pupils. Four aspects are important in this context: 1) Pupils should learn to identify elements of unity in the great variability of nature. 2) Pupils should learn about differences between living and non-living nature, including the unity of life and its links to non-living nature. 3) Pupils should learn elements of system thinking and a system approach to living nature. 4) Pupils should learn the foundations of

systematics including a knowledge of the basic fauna and flora species. On the basis of examples from the 9th and 11th classes the author cites various examples which illustrate the above described aspects and their implementation.

didactics of biology - biology instruction - logical procedures - logical thinking + pupils - system thinking - GDR. 147313.

6.7.3 Developing language skills in biology instruction

35. AHL, A.S.:

Determinism or Probability - or Teaching Students How to Ask Questions

The American Biology Teacher, 45, 1983, No. 2,
pp. 102-104.

Various phenomena encountered in science can be explained on the basis of determinism or probability. Sometimes of course the latter method is not suitable and the former is better, sometime the situation is the other way around. Determinism explains an effect of the basis of its cause, the effect is repeated when the cause is present and the same cause always leads to the same effect. On the basis of the same conditions the observer will draw the same conclusions. But a number of phenomena cannot be explain on the basis of determinism and then probability, based on statistical methods can be used. The author attempts to explain some practical aspects of these methods. He illustrates both methods on the basis of the rules

of hierarchy, perspective, incomplete knowledge and mandatory probability explanations.

didactics of biology - biology instruction - questions - determinism - probability - USA. 147305.

36. RAUBER, A.:

Fragenstellen - ein Erziehungsziel (The formulation of the question - one of the educational aims)
Biologie in der Schule, 32, 1983, No. 5, pp. 207-208.

Already at a preschool age it becomes clear that cognizance begins with asking questions. In school, however, pupils must be guided towards either asking more questions or sticking to the subject-matter being taught and not causing digressions with their questions. The author stresses the need for the teacher to devote attention to the way he or she formulates questions, as well as the formulation of questions on the part of pupils and how to provoke questions from pupils, especially in the 8th to 10th classes. It is important that the pupil trust the teacher, that good questions are praised, that motivation is provided and that pupils systematically are guided towards asking questions, etc.

didactics of biology - biology instruction - questions + formulation + motivation - pupil activity - GDR. 147307.

6.7.4 Logical models in biology instruction, cybernetic models in biology instruction

37. HENER, T.:

Einsatz elektronischer Simulationsmodelle im Biologieunterricht (The use of electronic simulation models in biology instruction)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 2, pp. 63-65. 2 figs.

All aspects of the nervous system are very complicated. The author recommends the use of electronic simulation models which can very well represent neurophysiological phenomena, the functions of sensory organs and nerve cells which transmit impulses.
didactics of biology, biology instruction - nervous system - nerve cell - physiology - simulation - model - FRG. 146310.

6.8 Scientific education in biology instruction

38. OSBORNE, R.J. - WITTROCK, M.C.:

Learning Sciences: A Generation Process

Science Education, 67, 1983, No. 4, pp. 489-506.
1 fig.

Empirical findings from a recent study project indicate that in spite of essential changes which have taken place in science education in the last three decades, there are still a number of problems on how and what to teach. One of these problem con-

cerns the fact that usually previous knowledge and empirical knowledge are not sufficiently taken into account in subsequent science instruction. Also teaching and learning require different approaches. The authors here develop a model based partially on knowledge as old as the Ancient Greeks and partially on very recent findings in neurophysiology. They cite the manner in which children in a recent study spoke about such concepts as friction, force, kinetics, gravity, temperature, heat, physical change, electrical circuit, fauna, life, etc. They indicate that already young children have their own concepts which are of course not always in accord with what is learnt in school.

didactics of biology - biology instruction - science education - USA. 147361.

6.8.1 The forming of a scientific worldview in Biology education

39. DLUBEK, R.:

Karl Marx - Begründer der wissenschaftlichen Weltanschauung der Arbeiterklasse und des realen Sozialismus. Teil 1. (Karl Marx - the founder of a scientific worldview of the working class and real socialism. Part 1) Biologie in der Schule, 32, 1983, No. 4, pp.129-134.

Karl Marx together with Friedrich Engels created a scientific worldview for the working people. This scientific worldview also at the beginning of the eighties of this century is the mightiest and most

progressive trend of the times. The creation of a scientific worldview led to a revolution in the history of human thought. The author analyses the historical foundations of the development of a scientific worldview and in five points shows where the strength of the Marxist scientific worldview lies. philosophy - biology - scientific worldview - GDR. 147313.

40. BLUBEK, R.:

Karl Marx - Begründung der wissenschaftlichen Weltanschauung der Arbeiterklasse und des realen Sozialismus. Teil 2. (Karl Marx - the founder of the scientific worldview of the working class and of real socialism - part 2)

Biologie in der Schule, 32, 1983, No. 5, pp. 177-183.

The creation of socialism represents a change in all of society according to a previously set plan. Marx's, Engels' and Lenin's conclusions concerning the general laws of the transitional stage between capitalism and communism have proven to be correct. Especially the fact that a communist society must develop in two stages, socialism and communism, has been of great importance. Marx's economic teaching has explained the unavoidable demise of capitalism. At the beginning of the eighties the Marxist worldview strives to overcome the danger of war. A worldview should serve as an impetus to active attitudes. philosophy, biology, scientific worldview - GDR. 147313.

41. ERMISCH, E.:

Marx heute - Naturgesetzliches und gestaltschaftlicher Bezug (Marx today - a natural science and social approach)

Biologie in der Schule, 32, 1983, No. 2-3, pp. 54-60.

In Marx's concept, development is a central category; he considered Darwin's work as forming the natural science foundation of his own work. Development serves as a central notion of the whole Marxian system. The author discusses the concept of development from the point of view of evolution. In biology when various evolutionary factors are at work, evolution is a natural process which leads to the creation of new species. Progressive evolution is connected with the creation of more perfect species (the author cites various examples from biology and seeks parallels in the work of Karl Marx).

philosophy - biology - scientific worldview -
Darwinism - evolution - GDR. 147313.

42. FRICKE, G.:

Lenin und der schöpferische Geist unserer Weltanschauung (Lenin and the creative spirit of our worldview)

Biologie in der Schule, 32, 1983, No.6, pp. 225-230.

Practical revolutionary experience from the whole world has proven the increasing strength of the ideas of K. Marx in our era and the fact that Marxism and Leninism exist in indivisible unity. Marxism-Leninism has created the theoretical foundation for the activities of revolutionary parties of the working class

throughout the whole world. Its influence is constantly growing because it provides answers to all basic problems of our times. The contribution made by V.I. Lenin to the development of Marxism is in the creative manner in which he developed Marxism for new historical conditions. The author deals in detail with Lenin's theory of the party of a new type and its practical implementation.

philosophy - scientific worldview - Marxism-Leninism - GDR. 147313.

43. PAWELZIG, G.:

Karl Marx und der Stoffwechsel zwischen Mensch und Natur (Karl Marx and metabolism between man and nature)

Biologie in der Schule, 32, 1983, No. 2-3, pp. 49-54.

In Karl Marx's works, especially in "Das Kapital", we find not only the most profound and most comprehensive analysis of the laws of capitalism and its mode of production, but also an explanation of the nature of historically preceding and subsequent economic formations. In explaining the capitalist mode of production, Marx used the term metabolism. The author first explains why Marx used this term - he wanted to express the continuing interaction with the environment which is necessary for maintaining the existence of a living organism, as well as to stress the natural history origins of social life. The author goes on to show how Marx intensively studied scientific literature on agriculture and the extent to which his work is timely for understanding problems of the environment.

philosophy - biology - agriculture - capitalism +
production - man - nature - GER. 147313.

44. Programma "Filosofskie problemi yestestvoznaniya"
(Dlya kursov povisheniya kvalifikatsii uchiteley)
(A syllabus for teaching "Philosophical aspects of
the natural sciences" (In courses for increasing
teachers' qualification))
Biologiya v shkole, 57, 1983, No. 2, pp. 48-59.

On the basis of the recommendation of the Personnel Department of the Ministry of Education of the USSR and at the request of teachers addressed to the editors of this journal, a syllabus for a course on the philosophical aspects of the natural sciences is published. On the basis of the plan for the economic and social development of Soviet society, accepted by the XXVth Congress of the Communist Party of the Soviet Union, the increasing role of schools in the ideological influencing of pupils, as well as their parents and all working people is stressed. The successful solution of this problem assumes that teachers will have qualifications which will make them capable not only of passing on to pupils the sum of knowledge provided by contemporary science, but also teaching them to independently make use of all their knowledge and creative thinking. From this follow strivings to increase teachers' qualification, as well as the qualification of all staff in the educational and teaching system, above all in the area of ideological and theoretical training. The forming of pupils' scientific worldview assumes the introduction of philosophical aspects into the teaching of the natural sciences. For this purpose the Ministry of Education

of the Soviet Union has issued the above mentioned syllabus, which was drawn up at the M.V. Lomonosov State University in Moscow. It is designed for teachers of mathematics, physics, chemistry, biology and geography. Its purpose is to contribute to the philosophical education of these teachers. The course assumes the use of various forms of training, such as seminars, conferences and independent study. The most important problems of the course are included into special series of lectures in which a general characteristic of the natural sciences and their function in the development of society, as well as the philosophical aspects of the subject-matter are explained. The editors of the journal are publishing the syllabus for both parts of the course; the latter part includes also philosophical problems of biology.

philosophy - biology - further education + teachers - scientific worldview, syllabus + philosophy - Ministry of Education of the USSR - USSR. 147305.

45. PESCH, P.:

Erfahrungen und Vorschläge zur Erhöhung der weltanschaulichen Wirksamkeit des Biologieunterrichts

(Experiences and suggestions for increasing the worldview effect of biology instruction)

Biology in der Schule, 32, 1983, No. 2-3, pp. 60-74.

An ad hoc committee of the District Pedagogical Centre in Riese, together with members of the staff of the Academy of Pedagogical Sciences, have prepared a set of examples and tasks which aim at improving the worldview education provided within the framework of biology instruction. The guiding idea of worldview

education within the framework of biology instruction is that both science and socialism serve uniquely peace and progress. The basis for the forming of a scientific worldview should be facts, knowledge, abilities and skills, notions, laws and theory, as well as the authority of the teacher. The author provides various examples which concern the subject-matter of biology. For each example the author cites its didactical objective, the worldview idea it concerns, probable questions by pupils, existing experiences, the opportunity it provides for making use of literature and also a bibliography. The examples concern the dangers posed by insects, bacteria as the source of diseases, correct nutrition and the hygiene of the digestive system, as well as environmental conservation.

didactics of biology - biology instruction - worldview education - GDR. 147313.

6.8.1.1 Moral education

46. SHREGLEY, R.L.:

The Attitude Concept and Science Teaching

Science Education, 67, 1983, No. 4, pp. 425-442.

A theoretical paper which begins with a survey of literature on social psychology which provides definitions of attitude. First a history of the notion is described and its use by various natural scientists, philosophers and psychologists. The author stresses that attitudes are not congenital, but learnt. Several examples to support this thesis are given. Also on

the basis of various examples he shows that attitudes precede behaviour and that they are of social origin and hence can be influenced by society. In conclusion the author sums up his findings in the following points: 1) attitudes are acquired, 2) attitudes precede behaviour, 3) attitudes are influenced by social factors, 4) attitudes are the preparatory stage for a reaction, 5) attitudes can be assessed. The author also strives to take a stand on the problem of measuring attitudes. The paper is supplemented by an extensive bibliography.

didactics of biology - biology instruction - moral education - attitudes + students - USA. 147313.

6.8.3 Education towards socialist patriotism and proletarian internationalism in biology instruction

47. BISTRITSKAYA, A.S.:

Izucheniye materialov XXVI. syezda KPSS i Prodovolstvennoy programi SSSR v processe obucheniya shkolnikov botanike i zoologii (A study of the documents of the XXVth Congress of the Communist Party of the Soviet Union and the Food Program of the USSR in the process of teaching pupils botany and zoology)

Biologiya v shkole, 57, 1983, No. 4, pp. 21-23.

The author informs readers about her experiences with the use of important Party and government documents in class, as well as in extracurricula activities. The documents are used for the communist education of pupils and in forming their worldview, their attitudes towards

life and their interest in the activities of socialist society and its defence. This requires the gathering of various information and documents in quantity and quality which is in accord with the needs of the pupils during lessons. Pupils participate in preparations for class and in the gathering of these documents and information, they draw up tables and bulletin boards. During the lesson, pupils learn to use the documents and information prepared for them, they prepare presentations, graphs, applications of the information to their local region. The requirement of linking school activities with the practical activities of Soviet society are carried out during cooperation with local state farms and collective farms. The author cites examples from the botany course in the 5th class and the zoology course in the 6th class where the documents concerning the Food Program of the USSR are used. She also provides various suggestions for instance for the organization of pupil conferences, discussions and meetings with working people, which are regularly organized by the school.

didactics of biology - biology instruction - education + socialist patriotism - combining theory and practice - USSR. 147309.

48. KALINICHENKO, N.:

Svyato chtit i berech khleb (Bread should be honoured and economized)

Biologiya v shkole, 57, 1983, No. 4, pp. 62-65.

Pupils learn to understand the value of cereals in the course of productive labour. Pupils' work teams help in the cultivation of crops and also

during the harvesting of crops. Groups of teachers have variously considered how to fulfill the requirement of improving instruction, as well as labour and moral education, as required by the XXVith Congress of the Communist Party of the Soviet Union. The author of the article is the chief of a work team from the Kamyshevatsk secondary school and he informs readers about how the requirement of economizing is fulfilled. The work team was founded within the framework of the system of labour education which has concentrated on work in agriculture, where pupils from all classes work. Depending on their age they work in greenhouses, orchards, on experimental fields, on special plots of land at the local collective farm, etc. The work is carried on, on the basis of a special plan which is checked by various bodies in the school. Each class is held responsible for a section of the work to be done and it regularly discusses its work and any difficulties which are encountered. Special groups of pupils follow the way pupils use bread and other bakery products, with the aim of preventing their losses. Also the furnishings of the school should be used carefully, so as to prevent their damage. The book by Gitalov "Duma o khlebe" (The Tale of Bread) served as a stimulus for this type of educational activities.

didactics of biology - biology instruction - education
towards socialist patriotism - education + economizing -
USSR. 147313.

49. MOMOTOVA, A.P.:

Patrioticheskoe vospitanie uchashchikhsya v protsesse raboty na shkolnom uchastke (The patriotic education of pupils in the course of work on a school plot of land)

Biologiya v shkole, 57, 1983, No. 5, pp. 66-68.

The significance of a school plot of land for implementing the education of pupils towards socialist patriotism has so far not been the subject of detailed analysis. At the school where the author teaches, a special type of labour education is carried on. One of its objectives is to form in pupils a responsible attitude towards nature. The article acquaints pupils with methods of dealing with this task, for instance in the form of discussions, the drawing up of annual plans, acquainting pupils with the principles of nature conservation, the collection of seeds, fruits, leaves, etc. didactics of biology - biology instruction - school plot of land - education towards socialist patriotism - USSR. 147307.

6.8.3.1 Education to peace

50. Die Frage von Krieg und Frieden in der weltanschaulichen Auseinandersetzung (Problems of war and peace from a worldview point of view)

Biologie in der Schule, 32, 1983, No. 1, pp. 7-11.

The editors of the journal "The German Journal of Philosophy" in issues Nos. 9 and 11, 1982 published a round table discussion concerning problems of war and peace in the context of the scientific and techno-

logical revolution. A total of eight specialist from various institutions and institutes participated in the discussion. This article briefly sums up the subject-matter of the discussion.

biology - philosophy - education to peace - scientific and technical revolution - GDR. 147313.

51. TEMBROCK, G.:

Kriege sind kein Naturgesetz (War is not a law of nature)

Biologie in der Schule, 32, 1983, No. 1, pp. 1-6.

Among Western scientists the opinion has been expressed that aggressiveness is part of man's essence and that aggressive instincts are true instincts, just as those which concern food and reproduction. However, biologists are becoming aware of the fact that the notion of "aggressiveness" in an ethological context does not have a heuristic meaning; it is therefore more correct to speak of aggressive behaviour, which is aimed against individuals of the same specie and which is part of interspecie competition; they also stress that this aggressive behaviour is not a manifestation of the "aggressive instinct" but rather a component of various behavioural elements (food competition, protection of young, etc.). In other words aggressive behaviour is a mechanism, which provides an opportunity to implement demands made upon the environment. The author deals in detail with these demands. Aggressive behaviour also makes possible the gaining of food sources and creation of partnerships. Combat between people, which is the outcome of their volition, is something quite different. No organism has killed as many members of its own specie as man

throughout his history.

didactics of biology - biology instruction - aggressiveness + man - war - education to peace - GER. 147313.

6.6.4 Labour education in biology instruction

52. BYBEE, R.W.:

Human Ecology: Acid Rain and Public Policy

The American Biology Teacher, 45, 1983, No. 4, pp. 211-216.
Lit. 31., 2 tabs., 3 photos.

Acid rain is one of the most pressing problems of the present. Scientists are continuing to study the problem and seeking causes and consequences between the use of fossile fuels and acid rain. This relationship is becoming clearer. Worldwide action should be undertaken to limit the amount of acid rain, otherwise the forests of the world will be destroyed, as well as the fertility of the soil. The available information should be made more precise and politicians should be forced to accept the seriousness of the problem and together with the business sector they should deal with the problem on a world-wide basis. Human society is facing a grave problem and to put off dealing with it in all seriousness represents a huge risk. Immediate solutions should be taken on a local basis, but the whole problem should be tackled on a world-wide basis. Acid rain is an international, world-wide problem.

didactics of biology - work education - environmental control - acid rain - USA. 147386.

Sovershenstvovat uchebno-vospitatel'nyi protsess
(Improving the educational and teaching process)
Biologiya v shkole, 57, 1983, No. 4, pp. 3-7.

The author discusses some problems connected with improving the educational and teaching process. He considers the most important problem in this context to be an improvement in the effectiveness of the teaching lesson. For this a number of preconditions should be fulfilled. Lessons should have a high quality ideological content and important Party and Government documents should be included into their subject-matter, as well problems connected with the local economy, the findings and assessment of work done on school plots of land and by various pupil work teams. Each pupil should be taught the habits connected with independent work. A good teacher, typically, maintains proper discipline within his lessons, exercises flexible control over his pupils and uses a wide variety of forms and methodologies in teaching. Every educator should work in such a way that his pupils not only learn the required facts, but above all are capable of seeking and finding mutual relationships and making use of them in practice. For this reason stress is placed on well thought out preparations on the part of the teacher for each lesson. In the next part of the article the author provides a survey of objectives and tasks which are connected with the educational and teaching aims of biology; these include among others also problems of hygiene and sexual education and the teaching of a course on the "ethics and psychology of family life" (experimentally). Also

problems connected with improving ecological education and education towards nature conservation, as well as various forms of labour education combined with vocational guidance towards choosing an occupation in agriculture are discussed.

didactics of biology - biology instruction - labour education - vocational guidance - health-care education - USSR. 147313.

54. KOVALENKO, G.P. - TETELITSA, A.S.:

Iz opita raboti trudovikh obedineniy shkolnikov
(On the experiences on the work done by pupil work teams)

Biologiya v shkole, 57, 1983, No. 6, pp. 59-62.

One of the most important factors in increasing the activity of pupil work teams in rural schools, is the close cooperation of schools with state farms and collective farms in the vicinity. The article provides details about such activities in the Vitebsk region. A long-term plan of activities for pupil work teams has been drawn up, which especially stresses vocational guidance activities, as well as job training. The authors describe some of the results achieved within the framework of carrying out this plan.

didactics of biology - biology instruction - labour education - vocational guidance - USSR. 147317.

Kak vospitat u podrostkov interes k selskokhozyastvennomu trudu (How to arouse in older pupils an interest in working in agriculture)

Biologiya v shkole, 57, 1983, No. 2, pp. 66-69.

On the basis of his experience of twenty years the author, who is a biology teacher and also teaches labour education and who later became the principal of an eight-year school in the Zhitomir region of the Ukrainian SSR, provides an extensive analysis of the task of guiding older pupils in rural school towards seeking a career in agriculture. He describes the methods used and illustrates their effectiveness on the basis of examples. His point of departure are the far reaching changes which have occurred in the range of information and knowledge, as well as interests of rural pupils, who during the last 25 years, under the influence of the mass media and contacts with older pupils and older people, as well as under the influence of schools, have changed a great deal. The author stresses the importance of the knowledge available to individual pupils, and the opportunities which teachers have to influence them, of course assuming that the teachers know their pupils thoroughly. An especially important role in the area of education towards a positive attitude towards work and specifically towards agriculture, is played by the forming of strong emotional ties towards the land, on the basis of the pupils' active participation in work. Pupils who are active in work and in the life of society should be praised.

didactics of biology - biology education - work education - rural schools - vocational guidance - USSR. 147337.

56. SAMORODOVA, T.N. - SOKOLOV, K.A.:

Stanu zhivotnovodcom (I shall become a worker in animal husbandry)

Biologiya v shkole, 57, 1983, No. 6, pp. 52-58.

5 figs.

At a meeting of young people interested in animals, when they were asked what kind of career they plan, the majority answered that they intend to work in animal husbandry. The author describes the activities pertaining to vocational guidance in this field, undertaken by schools in cooperation with collective and state farms.

didactics of biology - biology instruction - work education - vocational guidance - USSR. 147307.

57. SENNOVA, F.P.:

Kogda trud - prizvanie (When work becomes a calling)

Biologiya v shkole, 57, 1983, No. 2, pp. 61-62.

A letter to the editors which praises the work of a secondary school teacher from School No. 21 in Smolensk, named L.M. Zuyeva. Her teaching lessons are very well prepared, are scientific, logical and based on a knowledge of the psychology of individual pupils which enables her to teach creatively; she very successfully uses textbooks and technical didactical media and she effectively appeals to the emotions of pupils and thus systematically forms their emotionally active relationship towards nature and the current task of the whole country, as well as a scientific worldview. An important component of this work is the guidance of pupils in the course of extra-curricula activities (for instance regular dis-

cussions on nature conservation, participation in Biology Olympiads, participation in flower cultivation hobby clubs, organizing exhibitions of flowers at various occasions, etc.). L.M. Zuyeva also devotes attention to the biology teaching media stock room and the making of various biology teaching aids. She is an active member of the Methodological Committee of the District Association of Biology Teachers. She has no failing pupils and the number of her pupils with excellent marks is continually increasing. She has been awarded for her outstanding work.

didactics of biology - biology instruction - biology teacher - USSR. 147305.

58. Vospitivat distsiplinu, otvetstvennost i trudolyubimost (Educating pupils to be disciplined, responsible and to love work)
Biologiya v shkole, 57, 1983, No. 6, pp. 3-6.

Education towards being disciplined, responsible and having a positive attitude to work begins already at a preschool age and continues in school. These are highly demanding tasks which assume that the teacher has mastered pedagogics. Education does not take place only in school, but also in extracurricular activities and during labour education. The article also describes how these tasks are implemented in the schools of the Kurgan region.

didactics of biology - biology instruction - work education - USSR. 147507.

6.8.5 Polytechnical education in biology instruction

59. ATANASOVA, T.:

Iz metodicheskata rabota po biologiya (On methodological work in biology)

Biologiya i khimiya, 26, 1983, No. 3, pp. 37-38.

The article deals with the methodological aspects of the biology teaching syllabus for the 9th class and the implementation of the polytechnical principle of instruction on the basis of combining theory and practice. Teachers' reactions to the textbook now being used have been positive. The author recommends the use of a method developed by M. Vitkova, a teacher at a general education secondary school with Russian as the teaching language, who has a card file for all topics taught in the biology course with references and links to other teaching subjects. At the same time the sum of information available for each topic steadily increases as new items are added to the file. The author also recommends drawing up diagrams to show how far each teacher has come in teaching the biology syllabus, so that teachers can help each other, should this need arise. Such collective forms of work can also have the form of bulletin boards which serve to stimulate and improve biology teaching. In conclusion the author shows how these forms of cooperation and work can improve teaching on the basis of the examples of geology and nature conservation.

didactics of biology - polytechnical education - 9th class - card file - Bulgaria. 147307.

6.8.7 Education towards nature conservation and
environmental control in biology instruction

60. BALTUS, J.:

Apokalypsa orchideí (The apocalyp of orchids)
Věda a technika mládeži, 37, 1983, No. 19, pp.594-595.

In the town of Havlíčkův Brod members of a hobby club of young natural scientists have taken plants of the Orchid order (specifically Orchids and Menyanthes trifoliata) and transferred them to the territory of a natural reservation when their own habitat was about to be destroyed by a land reclamation project. They found that the number of plants of the Orchid order is seriously threatened on the territory of Czechoslovakia.

didactics of biology - hobby club - nature conservation - environmental control - botany - Czechoslovakia. 147317.

61. BALTUS, J.:

Času je málo a voda stoupá. Akce dno. Zápas mladých
o prodloužení života pacienta jménem "Příroda"
(There is little time left and the water mark is rising. The lake bottom project. The struggle of young people to extend the life of a patient called "Nature")
Věda a technika mládeži, 37, 1983, No. 15. pp.468-469.

In southern Moravia, at the confluence of the rivers Svatka and Dyje, three large artificial lakes are replacing existing meadows and grassland as part of a land reclamation project. Young nature conservationists have begun to transfer protected plants

from the bottom of the future lakes and to plant them on the territory of the nature reservation found at Křivé jezero. The plants include above all the flowers Siberian iris, Summer snowflake and Squill.

didactics of biology - hobby club - nature conservation - botany - Czechoslovakia. 147317.

62. BALTUS, J.:

Zánik lužního lesa (The demise of meadow-forests)

Věda a technika mládeži, 37, 1983, No. 12, pp.372-373.

3 figs.

So-called "hard meadows" are combined forests and meadows with large numbers of oaks^{and} ash trees, Oaks live for many years, but ashes tend to be attacked by wood rot. Such meadow-forests along the river Dyje in southern Moravia are rapidly dying due to the reagination of the river which was undertaken to prevent floods. Now the flora along the river banks is drying up since it obviously cannot exist without the annual floods. One of the typical characteristics of meadow-forests are large fluctuations in the supply of water in the course of the year. During the spring floods the blind arms of the river are flooded and they become a paradise for water fowl. The demise of the meadow-forests is the outcome of human intervention, especially land reclamation programs. The forest become dry, the seedlings of woody species are destroyed and the whole community typical for meadows-forests changes.

biology - nature conservation - environmental control - forests - land reclamation - Czechoslovakia. 147396.

63. BIZUBOVÁ, M.:

Z histórie ochrany prírody na Slovensku (From the history of nature conservation in Slovakia)

Prírodné vedy ve Škole, 34, 1982-1983, No. 4, pp. 129-131. Lit. 7.

The development of nature conservation in Slovakia is connected with the development of education. In spite of extensive human intervention, a number of ecotypes with endemic and relict species of plants and animals are still intact in Slovakia. The author deals in detail with the history of nature conservation in Slovakia since medieval times until the present. Now there are three national parks in Slovakia (the Fatra Mountains Park, The Low Tatra Mountains Park and at the National Park of the Pieniny area on the Polish border), 11 landscape reserves, 200 nature reservations, protected sites, protected study areas and protected parks or gardens. Another 200 protected natural formations have been declared by district bodies.

biology - nature conservation - history - Slovakia - Czechoslovakia. 147313.

64. BONEVA, S.:

Prírodosashchitnata deynost ot specializiraniye otryadi "Zeleni patruli" (Nature conservation activities carried out by special teams of "Green Watches")
Biologiya i khimiya, 26, 1983, No. 3, pp. 42-44.

Eight kilometers to the west of Kusanlik one of the largest new structures in Bulgaria is found - the G. Dimitrov dam. In the vicinity of the dam a recreational area has been founded where forest planting work began in 1948 and was completed in 1956.

The new mixed forest contains 46 different woody species. Teams of young people called "Green Watches" patrol the area to protect it. They also carry out a study of the environment in the vicinity. Instead of using chemical methods of combating pests they have begun to use biological methods. Chemical media have negative effects also on those insects which are valuable, as well as on people. Biological combat is based on supporting insectivorous birds, as well as entomophages and the forest ant. The members of the "Green Watches", aided by members of the Young Pioneer Organisation, care for young trees and shrubs, for ant hills and other animals which help in biologically combating pests and they also organise educational activities among young people and adults.

didactics of biology - biology instruction - hobby clubs - nature conservation - biologically combating pests - Bulgaria. 147307.

65. BYBEE, R.W.

Why Acid Rain ?

The American Biology Teacher, 45, 1983, No. 4, pp. 192-193. 1 photo.

Long-term chronical changes in the intensity of processes taking place in a system are just as important as acute changes of high intensity. The former is especially dangerous when it acts day in and day out for long periods of time. People tend to discount such changes and not take into account their long-term consequences, for instance for the human organism, respiration and the ecosystem. A clear example of this type of change is acid rain caused by the presence of

sulphur dioxide in the atmosphere. In many places acid rain is now much more acid than it was in the course of the industrial revolution. Even non-polluted rain is slightly acid (pH 5.6). Acid rain influences the whole environment. Science has more or less solved the problem, but practical measures are only in their beginnings. The author points out that biology teachers have an important role to play in this context. He defines acid rain, describes its history, existing situation and future trends. Also a bibliography of articles on the subject is provided.

didactics of biology - biology instruction - nature conservation - environmental control - acid rain - USA. 147313.

66. TSAHOV, Z.:

Problemt sa zashchita na prirodata pri izuchovane na
grbnachnite shivotai v ebuchenieto pe biologiya

(Nature conservation problems in the study of vertebrates in the biology course)

Biologiya i khimiya, 26, 1983, No. 2, pp. 38-41.

Nature conservation and environmental control are very complex problems. They have various aspects, including the socio-economic, scientific, legal, moral, ethical psychological and pedagogical. In the 7th class the subject-matter of the biology course provides opportunities to implement nature conservation and environmental control education in relation to fauna. The author provides methodological instructions in relation to various classes of chordata and indicated where the above mentioned aspects can be included into the syllabus, especially in the context of learning about specific animals (fishes, amphibians, reptiles, birds and mammals).

didactics of biology - biology instruction - education
towards nature conservation - environmental control -
chordata - Bulgaria. 147307.

67. CARLSON, J.:

Why Teach About Precipitation ?

The American Biology Teacher, 45, 1983, No.
pp. 222-227.

One of the most serious task facing science is to measure and define the damage done by acid rain in various parts of the world. Two thirds of the USA have acid rain precipitation ranging from weak pH numbers, up to very high ones. Since acid rain is such a frequently encountered phenomenon, science teachers cannot avoid discussions about it and its influence upon the environment, flora and fauna. They should specifically show the effect of acid rain on more vulnerable ecosystems. Teaching aids for this topic should be developed and regional specific aspects stressed; also various projects carried out by students should be encouraged. The author discusses the teaching of this topic in class^{and} during laboratory field work. Examples of the influence of acid rain on food chains and food networks are cited and the possibility of using experiments and observations for the clarification of the above mentioned problems are discussed.

didactics of biology - biology instruction -
education towards environmental control - acid rain -
experiments - observations - USA. 147307.

68. COWLING, E.B.:

Acid Precipitation, Scientific Progress and Public Awareness

The American Biology Teacher, 45, 1983, No. 4, pp. 194-202.

Lit. 59, 2 figs., 2 photographs.

Acid rain is beginning to have serious consequences and this has led to a public debate on the subject in which educators have an important say. At present acid rain is the most important link in the chain of causation which leads to changes in the chemical aspects of the climate on Earth. The burning of fossil fuels, and the large scale production of metals with their aid, leads to the emission of large quantities of gaseous, aerosol and other particles into the atmosphere where they spread over a wide area and in the form of acid rain cause dangerous changes in flora, fauna, people and the soil. These changes often occur at some distance from the source of the pollution. Large industrial complexes which exist in many countries are thus destroying forests, fishes, crops and human health. International cooperation is needed in the struggle against acid rain and its consequences. The author describes the history of the problem, the advances made in agricultural science concerning the effects of acid rain, the findings of European researchers concerning the long-term ecological effects of acid rain, studies carried out in the USA and the need for future international deliberations and studies. During the last 20 years acid rain has become an important problem both in Europe and the North America. The author discusses atmospheric processes and systems,

the influence of acid rain on the soil, vegetation, the quality of the water and the human environment. This problem is also entering the subject-matter of biology school courses. Biology teachers can play an important role in providing students and the public with the relevant information.

didactics of biology - biology instruction - nature conservation - acid rain - USA - 147307.

69. ČERNŮCH, P.:

Ochrana životního prostředí z hlediska branného
(Environmental conservation from a defence point of view)

Přírodní vědy ve škole, 34, 1982-1983, No.5, pp.165-166.

Education towards environmental conservation forms a component of defence education. This education is here understood in the broadest sense of the word, which includes natural, social and regional, as well as global aspects. Defence education contributes to environmental conservation education but it cannot cover this problem by itself. The utilization of conditions for education towards conserving the natural environment depend upon the ideological, professional and methodological quality of educators. Current objectives should be linked to this education, as well as those for the future; the behaviour of pupils and their future attitudes in relation to the natural environment should be influenced. In this context various educational situations should be created in a planned and purposeful manner, supplemented by class-work and also by special defence education exercises, as well as during defence hiking excursions, in hobby

club activities, etc. The author points to the existing danger of war and the existence of modern weapons of mass destruction and their influence upon the human environment.

didactics of biology - biology instruction - education towards environmental conservation - defence education - Czechoslovakia. 147396.

70. ČEŘOVSKÝ, J.:

Ochrana fyto-genofondu Sovětského svazu (Conservation of the phyto-geno-pool of the Soviet Union)

Věda a technika mládeži, 37, 1983, No. 21. pp.658-659.
3 photos.

No plant species can be allowed to become extinct, even when for the time being it may not seem of particular importance. The flora of the USSR includes 20.000 species of the higher plants and ferns, which represents about one tenth of the flora found throughout the world. Much attention is devoted to maintaining the geno-pool of the USSR. In 1975 a Botany Congress was held in Leningrad. In 1978 a meeting of the International Association for Nature Conservation and Natural Resources was held in Ashkhabad. The Red Book of the USSR now includes 437 species of higher plants. The requirement of conservation of the geno-pool is of concern to all of Soviet society. Conservationists closely cooperate with those who work in agriculture, as well as with those on whose land species of the phyto-geno-pool are found.

didactics of biology - environmental conservation - flora - nature conservation - USSR. 147307.

71. DERVIZ-SOKOLOVA, T.G. - KUZENKOVA, L.J. -
POLUDENIY, L.V.:

Zelenaya apteka i yeyo okhrana (A green apothecary
and its conservation)

Biologiya v shkole, 57, 1983, No. 1, pp. 62-67.

The authors continue in the subject-matter of an article published in No. 2, 1982 of this journal, which concerned the conservation of medicinal plants. Here they again deal with problems of conservation, as well as how to collect, dry and cultivate medicinal plants. In the introduction, they mention how pupils can determine the density of growth of a specific plant and how to determine the quantity of the plant which can be collected without threatening its well-being. They also describe in detail how these plants should be picked, dried and stored. However, greatest stress is placed on the cultivation of these plants for instance on school plots of land. For several often cultivated medicinal plants they also provide detailed instructions on how to prepare the garden bed and seeds and how the plants should be cultivated and harvested.

didactics of biology - biology instruction - nature
conservation - medicinal plants - cultivation +
medicinal plants - school plot of land - USSR.
147307.

72. DYLLA, K.:

Anschauen immer - Abpflücken nie ! (Plants should be observed, not picked !)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 1. p. 14.

The author cites the example of a group of pupils who prepared a poster dealing with nature conservation. Each group was given the instructions concerning nature conservation used in Hasse and a workbook for nature conservation activities. In the course of three teaching lessons they discussed problems of motivation, objectives and choice of objects for the campaign, as well as the making of the poster. After each pupil made a poster they were discussed and the best ones were hung up in the school.

didactics of biology - biology instruction - nature conservation - publicity campaigns 6th class - basic school - FRG. 147307.

73. ERDELEN, M.:

Fakten, Taktik, Ideale - Naturschutzalltag im Rollenspiel (Facts, tactics, ideals - nature conservation in a game)

Naturwissenschaften im Unterricht - Biologie, 32, 1982, No. 11, pp. 350-354.
1 model for transparency.

The author describes an exercise, which is very close to reality, in which pupils become acquainted with the complexity and tactics of creating a conservation reservation. A game is played where various pupils cite arguments for and against creating such a reservation and individual pupils provide arguments for or against the project. The author recommends

the use of games concerning ecological problems and in conclusion of the ecology course the game can be played in the context of a practical ecological exercise.

didactics of biology - biology instruction - ecology - practical exercises - nature conservation - FRG.
147307.

74. CORHAM, E.:

Acid Rain: What We Must Do ?

The American Biology Teacher, 45, 1983, No. 4,
pp. 203-210.

Lit. 24, 1 tab., 2 photos.

Acid rain was first identified in 1852 by Angus Smith in Manchester, Great Britain. Modern studies of the problem first began in 1950. The author cites 74 items in his bibliography which deal with recent developments in acid rain. He defines the term acid rain and specifically describes the toxic metals which are often components of acid rain, as well as the sources of acid rain in general and the area where the precipitation occurs and when acid rain began to be problem, the increasing amounts of toxic substances in acid rain which have been measured, as well as the many problems connected with the phenomenon. In conclusion the author indicates possible solutions. At present the most pressing problem is to decrease the amount of sulphur oxides emitted into the atmosphere at least by half. This objective is demonstrated on the example of the USA and Canada: if the USA does not carry out this objective, then the fishing industry in the lakes of Canada and the growth of forests will both cease to exist.

didactics of biology - biology instruction - ecology -
environmental conservation - acid rain - USA. 147396.

75. HINTERMEIER, H.:

Der Baum als Unterrichtsthema. Ein Beitrag über die
Bedeutung, die Gefährdung und den Schutz von Bäumen
(The tree as a topic for instruction. A contribution
to clarifying the significance and conservation of
and threat to trees)

Naturwissenschaften im Unterricht - Biologie, 31, 1983,
No. 12. pp. 422-443.

Lit. 42, 1 model for transparency, 7 worksheets, 2 figs.

In the FRG trees have been dying for a number of years. So far, however, this phenomenon has not been a subject of intensive study in schools. This topic is, however, highly relevant for school instruction. The author here deals with it from the point of view of six partial aspects and stresses the biological, ecological, environmental and conservationist points of view. The objective of this instruction is to educate in pupils a correct attitude towards nature conservation. Due to environmental causes 560 000 ha of forest in the FRG have been damaged, i.e. 7.7 % of all forests in the country; this figure includes 420 000 hectares with light damage, 106 000 hectares with medium damage and 34 000 hectares with very extensive damage. From the point of view of species, this includes 260 000 hectares of spruce, 100 000 hectares of fir and 90 000 hectares of pine as well as 90 000 hectares of deciduous forest, and 20 000 hectares of other species. The author suggests teaching units on the following topics: the structure of the tree, its functions, how to

determine the species of trees in the vicinity of the school, the physical, physiological, psychological and cultural functions of trees, a tree as a living community, oaks and their flora and fauna, an old fruit tree as a living community, factors which are damaging to tree and the cause of their death, gaseous emissions into the atmosphere, salting roads, the construction of buildings, soil pollution, the construction of roads, traffic, land drainage projects, the planting of too many spruce, tree gnawing by animals, possibilities for tree conservation, fertilization, tree surgery and other conservation measures, the cultivation and planting of trees, forestry nurseries, measures for conservation of greenery in urban areas.

didactics of biology - biology instruction - nature conservation - environmental control - conservation of trees - FRG. 147307.

76. HINTERMEIER, H.:

Naturschutz vor der Haustür (Nature conservation in the immediate vicinity of our homes)
Naturwissenschaften im Unterricht - Biologie, 31, 1983,
No. 8, pp. 278-287. Lit. 23,
4 models for transparencies, 7 tabs.

Gardens in front of houses should also contribute to nature conservation. Their flora should be varied and have flower beds, as well as shrubs and trees, the soil should have a sufficient quantity of humus so that various micro-organisms and small organisms can live there; this in turn provides food for birds, reptiles and small mammals. This type of garden can

help to stop the ongoing decline in the number of species found in the FRG, where 40 % to 60 % of flora and fauna are now threatened. In the FRG, 13 million households have their own garden, that is 54 % and annually another 200 000 persons acquire new gardens. The average size of gardens is 550 m^2 , which represents $7\,000 \text{ km}^2$. The author describes such gardens as the living environment for birds, butterflies, amphibians other useful animals such as hedgehogs, shrews, polecats, lizards, toads, ladybugs, beetles and other insects, including braconoid wasps and ichneumon flies.

didactics of biology - biology instruction - garden - nature conservation - environmental control - gardening - FRG. 147307.

77. HINTERMEIER, H.:

Schmetterlinge - zum Aussterben verurteilt ? Anregungen zur praktischen Gestaltung des Themas - "Gefährdung und Schutz von Schmetterlingen"

(Are butterflies committed to extinction ? Suggestions for the practical teaching of the topic "The threat to butterflies and their conservation")

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 3, pp. 96-110. Lit. 51, 5 worksheets, 4 figs., 1 tab.

Butterflies are at present the most threatened group of insects. Man has systematically disrupted their environment by changing the landscape. Every day people cause 5 species of animals to become extinct and if we add the lower and higher plants, then a total of 20 species disappears each day, annually 7000 and by the year 2000 a total of 150 000 species

will have disappeared. Thus man has accelerated the rate of extinction 3000 times ! At present more than one third of European species of butterflies are threatened with extinction and of 164 species of day-time butterflies in the FRG, 51 species are threatened with extinction. The author therefore suggests including butterfly conservation into the biology teaching syllabus. He recommends that butterflies are not caught, but rather documentation accumulated with the help of photographs. He also recommends the use of the problem method of teaching, the use of nature conservation posters and founding chapters of the Nature and Environmental Conservation League in schools. For inclusion into class work he recommends the following: the development and ecological status of butterflies, the main causes of the contemporary threat to them, deforestation and its consequences, changes in the landscape, the consequences of using artificial fertilizers and the pollution of the environment, the influence of traffic and mass transport systems, hunting butterflies for commercial purposes, the mapping of butterflies, photo-documentation, extending pupils' knowledge of butterfly species.

didactics of biology - biology instruction - nature conservation - education for nature conservation - butterflies - FRG. 147307.

78. HORA, J. - KAMÍNEK, V.P.:

Je labutí moc ? (Are there too many swans ?)

Věda a technika mládeži, 27, 1983, No. 9, pp. 276-277.

3 photos.

Previously swans were considered to be decorative birds and were found mostly in palace gardens. Now they have greatly proliferated and their nests can be found on large numbers of ponds and on rivers. In 1982, 500 to 550 swan couples had nests in Czechoslovakia and their total number was estimated at 4280. In June 1982, after their eggs had hatched, there were 5000 to 5500 swans in the country. In the GDR in 1971 there were 1500 swan couples and 17000 swans; in Poland almost 3000 swan couples had nests and in Denmark in 1979 there were 4000 swan couples, half of them living in colonies. The aggressiveness of swans is highly individual and the population explosion among swans in no way hinders the greylag goose whose number are also increasing. Swans are uniquely vegetarians and in this country they have no natural enemies. They are only threatened by the microbe *Clostridium botulinum*, which is the cause of the disease botulism, but of a different type than that which afflicts people. Man and his activities are the most important regulator of the numbers of swans; they are damaged by the spring fish catching in fish ponds, the pollution of waters by oil, mazut and kerosene, electrical power grid systems and they run into the cables of long-distance electrical power grid systems. In the winter they may suffer from frost. Every year on June 4th and 5th a state-wide swan census is taken in Czechoslovakia.

didactics of biology - biology - nature conservation - birds - Czechoslovakia. 147307.

79. IMAMALIEV, E.S.:

O prirodnookhranitel'noy deyatel'nosti shkolnikov Azerbaydshana (On the nature conservation activities of pupils in Azerbaydshan)

Biologiya v shkole, 57, 1983, No. 1, pp. 59-60.

In the introduction, the author stresses the need to educate pupils towards nature conservation. He then acquaints readers with the varied forms of nature conservation activities which exist with the varied forms of nature conservation activities which exist in the schools of the Azerbaydshan school system. Groups of young nature conservationists not only study theoretical aspects of the problem, but also undertake practical activities such as planting greenery. In the concluding part of the article the author cites specific examples of the work of nature conservation hobby clubs in schools.

didactics of biology - biology instruction - nature conservation - hobby clubs - USSR. 147307.

80. JURČÁK, J.:

Některé druhy Červeného seznamu flory ČSR (Some of the species on the Red List of Flora in the Czech Socialist Republic)

Přírodní vědy ve škole, 34, 1982-1983, No. 1, pp. 8-9.

The first version of a Red List of Threatened Flora in the Czech Socialist Republic has recently been published. The photographs on the cover of the publication show some of the plant species included on the list. Many of these plants already have been protected by a Regulation issued by the Ministry of Education and Culture on April 14th 1958. However,

during the last 20 years conditions have greatly changed, and the environment of flora has deteriorated to such a extent, due to civilizational pressures on the environment, that other measures are needed if anything is to be done. These pressures are negative as a consequence of the scientific and technological revolution. At the end of 1976 the Czechoslovak Botanical Society discussed the situation in Czechoslovak flora and decided to draw up lists of threatened species for both Bohemian and Slovakian and on the basis of these lists the Red Book has now been published. The first list for Bohemia were drawn up by Holub, Procházka and Čerovský in 1979. They are divided into the following categories: extinct and missing species, strongly threatened, threatened, and rare taxons requiring further attention. Specific examples are cited for each group. The author recommends including threatened species and the whole concept of Red Books into the biology teaching syllabus of general education secondary schools.

nature conservation - plants - natural environment -
Czech Socialist Republic - Czechoslovakia. 147396.

81. KAMÍNEK, V.P.:

Kasaňským ochráncům patří dík (Our thanks to nature conservationists in Kasakhstan)

Věda a technika mládeži, 37, 1982, No. 11, pp. 340-341.

In the ice age the Saiga tatarica antelope lived all over Europe and in Asia up to the Lena river, the New Siberian Islands, Mongolia and northeastern China. But at the beginning of this century only several herds remained. The Kasakh Soviet Socialist

Republic has begun to take conservation measures to preserve these now rare antelopes and has strictly forbidden their hunting. Their population has already increased. At present further problems are being dealt with, because the area of the wilderness which is suitable for the Saiga antelope is steadily decreasing, as the amount of cultivated land continues to grow.

nature conservation - mammals - Kazakhstan - USSR.
147396.

82. KAMÍNEK, V.P.:

Než přiletí šápi (Before the storks arrive)

Věda a technika mládeži, 37, 1983, No. 7, pp. 212-213.
2 photos, 2 figs.

The article deals with the biology, ethology and conservation of the white stork. In spite of all endeavours in this area, the population of this large bird is constantly decreasing. This is a consequence of changes in the landscape, land drainage and reclamation and the use of chemicals in agriculture which destroy the stork's most important food - amphibians. The author suggests that some meadows remain undrained or are even irrigated, so that storks will be preserved among our fauna. Existing stork nests should also be preserved and new ones built on suitable roofs or tree-tops. The seasonal movements of these birds are described and also the Black stork is mentioned. There are about 20 species of storks throughout the world.

nature conservation - birds - environmental control - Czechoslovakia. 147396.

83. KAMÍNEK, V.P.:

Projekt Formica (The Formica project)

Věda a technika mládeži, 37, 1983, No. 17, pp. 532-533.
1 photo, 2 figs., 1 tab.

The integrated conservation of the forest requires a new approach to nature. One of the most important projects under way at present is the protection of the forest ant (*Formica rufa*), which is a natural ally of man in conservation of the forest. The Formica project mentioned in the title began in 1982. The author describes the relation of certain species of plant lice to ants, the food of the forest ant, the mapping of ant hills in Czechoslovakia, methods used to record the incidence of this insect and how the study of its biology is carried out. In central Europe about 200 species of ants live and throughout the world there are approximately 6000 species.

biology - insects - nature conservation - Czechoslovakia. 147386.

84. KHOLOVÁ, H.:

Soumrak opeřených králů (The twilight of winged kings)

Věda a technika mládeži, 37, 1983, No. 5, pp. 148-149.
5 photos.

Birds of prey are very important for maintaining a healthy equilibrium in a particular landscape. They represent a sort of health-care police force. When necessary, they become scavengers and they hunt their prey under the most difficult conditions. They are now becoming the victims of poorly educated or misinformed hunters and game wardens, as well as foresters and they are also damaged by the use of chemicals in

agriculture and the destructions of the biotas where they build their nests. Birds of prey all over the world are threatened. In the USA the California condor, in Europe the Bearded vulture and in the Philippines the Monkey eagle are rapidly disappearing. A number of birds of prey have in fact already become extinct, for instance the Osprey and the Kestrel, while the population of the Hawk eagle, the Imperial eagle, the Harrier eagle, the Saker, the Peregrine falcon, the Lesser spotted eagle and the Golden eagle have all greatly declined. Also the Common and the Black Kite and owls are slowly disappearing from the landscape. The future of birds of prey and owls is very uncertain and depends on the rate of pollution of the environment.

biology - nature conservation - birds of prey -
Czechoslovakia. 147396.

95. KIESLING, R.:

Herstellen von Umweltschutzpapier an der Schule

(Making paper in school for environmental conservation)

Der Biologieunterricht, 19, 1983, No. 2, pp. 23-32.

Lit. 5, 4 figs.

The idea of making new paper out of old is not new, but the idea of making paper in school is new. During a celebration held at a technical secondary school in Reutlingen, participants had the opportunity to make paper themselves and to use it for printing something. Pupils from the 10th class of this technical secondary school explained to participants how to proceed and also prepared everything needed for the project. A poster which stressed en-

vironmental conservation invited the public to participate. At present the FRG produces only 38 % of the paper it uses, the rest is imported. The per capita annual consumption is 115 kg. Hence recycling of paper should be increased. The author also provides instructions for the collecting of scrap paper, and shows how school paper making can contribute to environmental awareness and how this topic can be utilised in the course of instruction.

didactics of biology - biology instruction - paper making - environmental conservation - FRG. 147307.

86. KLEINE, U.:

Hochertübergreifende Umwelterziehung durch Öffnen der Schulen nach aussen (Strengthening interdisciplinary education by making schools more open)
Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 5, pp. 171-172.

A report on the 6th Conference of the European Council which was held in Lussemburg on September 17th to 19th 1981, on the topic of education towards environmental conservation in schools. The models of education discussed concerned all schools within the countries of the Common Market. The author assumes that pupils will have sufficient opportunities to confront what they learn in school with the reality they encounter every day and that this will lead them towards a sense of responsibility for the environment and a willingness to participate in seeking solutions to various problems encountered in this area. The author also stresses the need to correctly choose educational and teaching objectives, to use modern

teaching methods and aids, to make full use of extra-curricula forms of education, as well as various practical means of instruction such as excursions, field work, visits to nature reserves and nature parks, etc. didactics of biology - biology instruction, environmental conservation - conference - FRG. 147396.

87. KOCJAN, A.:

Biuletyn międzynarodowego programu edukacji środowiskowej UNESCO - UNEP. (A bulletin on international educational programs for environmental conservation prepared by UNESCO and UNEP)
Biologia w szkole, 36, 1983, No. 3, pp. 183-188.

Since the sixties there has been an increasing interest in environmental conservation, due to the rapid development of industrial output and urbanization throughout the world which have led to a loss of equilibrium in the environment. Scientific societies, as well as governments have expressed an interest in these problems and international, as well as national centers for environmental conservation have been created. The first international conference on environmental conservation was held in Stockholm in 1972, in which 113 countries participated and observers from 400 international organizations. Also UNESCO, which on the basis of a resolution from a conference held in Belgrade in 1977, in which 96 countries participated, has an environmental program. Another conference on this subject was held in Tbilisi in the USSR also in 1977. Two organizations for education towards environmental control were entrusted with specific agendas: besides UNESCO also the United

Nations Environmental Protection Agency. A Bulletin published by UNESCO on this subject-matter is available from Connexion UNESCO, 7 place de Fontenoy, 75700 Paris, France.

biology - environmental conservation - conference -
UNESCO-United Nations Environmental Program - Poland.
147396.

88. KUKAN, Š.:

Gaštaný z rezervácie (Chestnuts from a nature reservation)

Přírodní vědy ve Škole, 34, 1982-1983, No. 4, p. 132.

Near the ruins of the Gymeš castle in the district of Nitra in Slovakia the Gaštanica nature reservation is found, with the remnants of an old Sweet chestnut orchard with 177 fruit-bearing trees, which yield between 50 and 70 centnars of chestnuts annually.

biology - nature conservation - nature reserve -
Slovakia - Czechoslovakia. 147313.

89. KUS, E.:

Tygrům zvoni hrana (The bell tolls for tigers)

Věda a technika mládeži, 37, 1983, No. 2, pp. 52-53.
2 photographs, 1 map.

The fate of tigers living in the wild in becoming very precarious. Their hunting and the destruction of their living environment are threatening this beast of prey. During the last century the number of tigers has decreased to such an extent that they have now been included in the Red Book. Previously a total of 8 different geographical races of tigers were known: the Caspian tiger, Indian tiger, the Ussuri or

Siberian tiger, the Chinese tiger, the Indochinese tiger, the Sumatra tiger, the Java tiger and the smallest, now already extinct Bali tiger. The largest animal is the Ussuri or Siberian tiger, while in terms of numbers, the Indian and Chinese tigers are in first place. The Indian government, together with the International Association for Nature Conservation has taken various measures to save the tiger; so far this has been the most extensive campaign to save a threatened animal. Large numbers of tigers are found in zoological gardens throughout the world, but these of course would not survive in the wilderness, they no longer know how to hunt. The area a tiger needs to acquire sufficient food in the wilderness is quite large, for instance the Indian tiger requires 300 km².

biology - nature conservation - mammals - Czechoslovakia. 147307.

90. KUS, E.:

Zapovedníky (Nature reserves)

Věda a technika mládeži, 37, 1983, No. 20, pp. 628-629.

Nature conservation is highly developed in the USSR, but nevertheless a number of organisms are threatened with extinction due to the onslaught of civilization. A network of nature reserves has been built, whose primary aim is to conserve threatened species. The oldest of these reserves are 60 years old and there are now a total of about 120, the majority of which are closed to the public. The oldest reserve is at Askaniya Nova and was founded in 1890; in 1921 it was made into a government reserve. In 1924 the Caucasian nature reserve was created.

The author cites a number of others, all over the Soviet Union.

biology - nature conservation - USSR. 147307.

91. LAUTERER, P.:

Akoe Formica (The Formica Campaigne)

Přírodní vědy ve škole, 34, 1982-1983, No. 3, p. 90.

The Czech Union of Nature Conservationists has initiated the Formica campaign. Members of the Union map the incidence of the Forest ant and organize the conservation of their anthills. Also members of the Socialist Union of Youth from secondary schools, as well as pupils from a basic school, participate in the work which was begun on May 1st, 1982. The author explains the significance and role of ants in regulating the number of insects in forest biotas, especially now, when most forests are damaged by chemical emissions. The article also contains a bibliography on the subject. Similar activities are under way also in other European countries.

biology - nature conservation - insects - ants - Czechoslovakia. 147396.

92. MEINCKE, I.:

Ökologie und Umweltschutz - ein neuer Kurzlehrgang für Biologielehrer (Ecology and nature conservation -

a new short-term course for biology teachers)
Biologie in der Schule, 32, 1982, No. 2-3, pp. 110-111.

This new course will be organized by the school biology section of the Biological Society, together with the Dresden University and will concern general ecology, as well as the ecology of microorganisms,

forest biotas and population ecology. An excursion followed by a laboratory exercise is part of the course.

biology teacher - further education of teachers - ecology - GDR. 147305.

93. MICHAJLOW, W.:

O pracach komitetu "Człowiek i środowisko" PAN

(On the activities of the "Man and the Environment" committee of the Polish Academy of Sciences)

Biologia w szkole, 36, 1983, No. 3, pp. 181-185.

On the basis of an appeal made by UNO general secretary U Thant in 1969, a committee was set up in 1970 in Poland in the Polish Academy of Sciences called "Man and the Environment" and work was begun, on an interdisciplinary basis, on problems of the environment and its conservation and control. The committee's members are various specialists and also representatives of various scientific societies and representatives of some branches of the economy, such as agriculture, as well as others who strive for the rational utilization and exploitation of natural resources and the environment in Poland. The committee cooperates with similar institutions in other countries and coordinates Polish participation in international activities.

environmental conservation - Academy of Sciences - international cooperation - research - Poland. 147396.

94. ODECHOWSKI, J.:

2 problemów kształtowanie i ochrony środowiska

(On problems of controlling and conserving the environment)

Biologia w szkole, 36, 1983, No. 3, pp. 138-145.

Lit. 20, 1 tab., 1 fig.

The author deals with current problems of environmental control and conservation in Poland.

environmental control - Poland. 147396.

25. RAUBER, H.:

Ackerunkräute, nicht nur Konkurrenten der Kulturpflanzen (Field weeds are not only competition for crops)

Biologie in der Schule, 32, 1983, No. 2-3, p. 217.

In recent years the amount of weeds on fields has greatly declined and some have even entirely disappeared. On the other hand some species are resistant to herbicides and have thus greatly proliferated and now pose a serious problem. Weeds should not only be considered as competitors of crops (which take away their nutrients, water and light), because they are in fact harmful only during specific periods in their development. On the other hand they may have a positive effect on the fertility of the soil (by creating organic humus) and protect the soil against erosion. Often they serve as hosts to parasites and insect pests.

botany - agriculture - weeds - herbicides, GRD.
147367.

96. REBROVA, L.V. - POPLAVSKAYA, S.S.:

Videt mir skvoz priemu dobrikh chuvstv (To see the world through positive emotional feelings)

Biologiya v shkole, 57, 1983, No. 4, pp. 60-61.

The article is devoted to the work of a teacher from a secondary school in Murmansk, A.A. Voronova, who during the 25 years she has been working in the school system has had a positive influence on her pupils' emotional attitudes towards nature. Her pupils not only learn facts but also acquire a positive attitude towards nature, life, their native region and a feeling of responsibility for the conservation and development of the nation's natural wealth. The article describes the methods she uses both in class work and in extra-curricula activities.

biology instruction - didactics of biology -
education for environmental conservation - nature con-
servation - secondary school - teacher - USSR.
147307.

97. ROTH, H.J.:

Schulreservat Bergisch Gladbach - Regrath, Be-
schreibung und Nutzung - mit vogelkundlichen Beispielen
(School reservation at Bergisch Gladbach-Regrath.
A description of activities and examples from ornitho-
logy)

Der Biologieunterricht, 19, 1983, No. 4, pp. 57-68.
Lit. 3, 2 worksheets.

The author describes the vicinity of the town, its flora, fauna and the many fish pond found here, which were previously used for breeding carps by the local monks. The reservation is suitable for field

work in zoology and ecology, especially for the observation of birds and especially for hobby club or other extracurricula activities.

didactics of biology - biology instruction - hobby club - ornithology - ecology - GDR. 147307.

98. RÁPAROVÁ, O.:

Ročně umírá 2 229 000 kangaroos. Ekologové a ochránáři varují a protestují (Annually 2 229 000 kangaroos die. Ecologists and conservationists warn and protest) *Věda a technika mládeži*, 37, 1983, No. 9, pp. 274-275.

Europeans first learnt about kangaroos in the 17th century. James Cook in 1770 described them for the first time in his dairy. They are Marsupials of which more than 250 species are known. The author describes their incidence, biotas and way of life and describes their relative isolation from the rest of the animal kingdom and their phylogeny, how they have adapted to their environment, their method of reproduction, embryonic diapause, the temporary infertility of males under unfavourable conditions for life, lactation, bacteria and the fermentation of cellulose in the digestive tract of kangaroos. These animals are hunted as a sport, for their skin and as a pet food. The export of kangaroo meat culminated in 1954. At present 12 species are seriously threatened. Approximately 25 to 45 million kangaroos live in Australia where a kangaroo census is being planned, which will be undertaken from satellite and by airplanes.

biology - zoology - marsupials - nature conservation - Australia - Czechoslovakia. 147313.

99. SIUTA, J.:

Przyrodnicze podstawy ochrony i kształtowania środowiska (The natural foundations of environmental conservation and control)

Biologia w szkole, 36, 1983, No. 3, pp. 145-150.

Lit. 10.

Man by his activities transforms the environment by changing its physical, chemical and biological properties when acquiring food and raw materials for himself. The degree of negative influence of man depends upon a number of factors, among them the natural characteristics of the environment itself and its resistance against the degradation caused by technical media and the degree of synchronisation between various components of the technology used by man on the one hand and the environment on the other. The most important task in this context is the thorough study, documentation and extended research of these problems. In Poland specifically, among the most pressing are problems of recultivation of land after sand, peat and coal extraction have taken place and problems of waste, ash and slag disposal, the conservation of surface and underground water, the recultivation of polluted soil and stopping the damage to trees in the forest.

biology - environmental conservation and control -
pollution - recultivation - Poland. 147396.

100. Sovershenstvovanie ekologicheskogo obrazovaniya i deyatelnost shkolnikov v oblasti okhrany prirody
(Improvement of ecological education and the activities of pupils in the area of nature conservation)
Biologiya v shkole, 57, 1983, No. 5, pp. 60-62.

The Ministry of Education of the USSR and the Union republics have issued a methodological instruction concerning improvement of the ecological education of pupils and their education towards environmental conservation. The article describes the content of this instruction, which specifically concerns the teaching of biology, geography, chemistry, the foundations of the Soviet government and legal system, and the social sciences. Existing problems in this area are analysed and various recommendations for improvements are cited.

didactics of biology - biology instruction - interdisciplinary relations - nature conservation - education for nature conservation - USSR. 147307.

101. STARCK, Z.:

Wplyw chemizacji środowiska na jakość pożywienia

(The influence of the use of chemicals upon the quality of food)

Biologia w szkole, 36, 1983, No. 8, pp. 150-154.

Is mankind threatened by a shortage of food or by the fact that chemicals are used for the production of food? A shortage of potassium and magnesium have a negative effect on people's health, a shortage of iron and copper in the soil have caused the fungus *Aspergillus flavus* to proliferate; this fungus is the source of aflatoxin, a carcinogenic

substance. On the other hand the amount of cadmium sometimes found in food which gets into the soil together with phosphorus fertilizers, as well as through industrial pollution, can be dangerous. Cadmium also accumulates in tobacco and from there gets into the lungs and liver of smokers. When it enters the bones and especially the spine, it can also cause grave damage. In Central Europe the quantity of cadmium found in food is up to 18 times greater than standard. Also large quantities of nitrogen found in food, which is the product of using nitrogen fertilizers, can be dangerous, especially for babies. Cases of death have been recorded caused by eating spinach, radishes or rhubarb which had been excessively fertilized by nitrogen compounds. Pesticides in food can lead to cancer and allergies. An accumulation of pesticides in the human body can damage the heart, liver and nerve system. Also heavy metals in food are very dangerous: these include lead from automobile exhausts, mercury, cadmium and nickel. Heavy metals, especially lead are carcinogenic and are especially dangerous for pregnant women and their foetus.

human biology - use of chemicals + environment -
agriculture - food - pesticides - heavy metals -
artificial fertilizers - allergies - cancer - Poland.
147313.

102. STUBBS, H.S.:

Acid Precipitation Awareness Curriculum Materials
in the Life Sciences

The American Biology Teacher, 45, 1983, No. 4,
pp. 217-221.

1 fig. 1 photo.

The author provides information on a new college curriculum on acid rain, which discusses fishing, recreation, tourism, national parks, nature reserves and the wilderness, agriculture and forestry, economic aspects, health-care aspects, the corrosion of metals and building stones and also the international aspects of acid rain. He also discusses the problem from a historical point of view, provides a modern definition of acid precipitation, the chemistry of the problem and relation to other environmental aspects. Also geological and meteorological aspects of acid precipitation are explained, with specific information about the situation in the USA. The respiration of plants, animals and man are affected by acid precipitation and the ecological aspect is very important - the author demonstrates this on food chains and food networks, on the biosphere, eutrophic and oligotrophic lakes and water ecosystems; also phytoplankton and zooplankton, the larvae of insects, fish, amphibians, birds and mammals in ecosystems are damaged by acid precipitation. Material which carries the marks of acid precipitation can be studied in the laboratory. One of the methods of combating the effects of acid rain is to add calcium and its derivatives into waters and the soil, to cultivate plants resistant to acids, to control emissions and to change energy sources. All these solutions bring a number of problems

which are discussed by the author in the context of the curriculum.

didactics of biology - biology instruction - acid rain - environmental conservation - USA. 147313.

103. SUDAKOVA, Z.V.:

Ryabchik (The Crown imperial plant)

Biologiya v shkole, 57, 1983, No. 5, pp. 75-77.

The Crown imperial plant is one of the genera of the liliaceae family, which includes approximately 2900 species. The plant grows throughout Euroasia, north America and northern Africa. This genus has 120 to 150 species and of this number, 26 grow on the territory of the Soviet Union. The author describes the morphology of this plant, which is becoming rare and has therefore been included on the list of threatened species.

didactics of biology - biology instruction - education for environmental conservation - protected plants - USSR. 146307.

104. SIROZCHKOVSKIY, Y.Y.- ROGACHEVA, E.V.:

Biosferkiye zapovedniki (Biosphere reserves)

Biologiya v shkole, 57, 1983, No. 4, pp. 8-13.

In the period of the scientific and technological revolution the influence of man is not limited only to nature, which is the immediate object of human activity, but has a more global impact. If negative changes in the biosphere are to be prevented, it is necessary first to study its properties and reaction to anthropogenic changes. This is possible only on the basis of comparative studies between areas

of the biosphere not influenced by man and those where changes due to human activities have already occurred. A number of natural landscapes and ecosystems can be maintained by a system of nature reserves, which are a highly advanced form of nature conservation. In recent years a network of new reserve areas called biosphere reserves have been created. They are part of an international program, organized by UNESCO, which is called "Man and the Biosphere". Its purpose is to conserve natural landscapes and original ecosystems as model biosphere areas in which the genetic material of a given territory has been concentrated. It serves for long-term ecological research and for carrying out the inspection and monitoring of changes and determining the development of world-wide pollution. These reserves differ from others in their internal zoning structure and by providing clearly defined opportunities for human activities. Only organized scientific excursions are permitted into these areas. These reserves exist in a number of countries and in the Soviet Union there are 7 of them.

nature conservation - environmental control - UNESCO - biosphere reserve - USSR. 147396.

105. Transparency Master: Areas of the United States Sensitive to Acid Rain

The American Biology Teacher, 45, 1983, No. 4, p. 239. 1 map.

A map which serves as a master for transparencies where the amount of acid rain in various parts of the United States is indicated and which is designed for use in teaching ecology. Areas with high, medium and low intensity acid rain are indicated.

environmental conservation - acid rain - transparencies -
map - USA. 147396.

106. TREITZ, P.:

Artenschutz und Präparatorenhandwerk Grundsatzurteil
des Bundesverfassungsgerichtes (Conservation of the
species and taxidermical shops - an important verdict
of the Bundesrepublik Constitutional Law Court)
Praxis der Naturwissenschaften - Biologie, 32, 1983,
No. 5, p. 163.

The author deals with the problem of whether
protected species of birds can be mounted in tax-
idermist shops and sold. This practice is forbidden
in the FRG. Exceptions from the law are protected
birds mounted for research, museums and for schools.
However, dead birds can be mounted, but proof must
be provided that they were found dead, and not shot.

nature conservation - law on nature conservation -
taxidermy - birds - FRG. 147307.

107. TREITZ, P.:

Unser Dorf soll "nistbar" werden ! (Our village shall
have bird nests !)
Praxis der Naturwissenschaften - Biologie, 32, 1983,
No. 5, p. 162.

The German Association for the Conservation
of Birds and the Nature Conservation Union have
appealed to all people living in villages to provide
sites for bird nests, specifically for swallows,
House martins, Screech owls, Barn owls and Long-eared
owls. The appeal concerns the owners of houses and
gardens. A suitable place for a nest should be found

and protection from the natural enemies of these birds provided. The author recommends pasting the silhouette of a bird of prey on large windows or green-houses so that small song birds do not tend to fly against the window and risk getting killed. Also the windows of basements should have bars, so that birds do not fly into them. The use of pesticides and artificial fertilizers should be limited as much as possible. The number of small birds has decreased by 30 % in the FRG.

nature conservation - birds - FRG. 147396.

108. TREITZ, P.:

Weder Räuber noch Totenvögel ! 74 Greifvögel und 38 Eulen in BBV - Pflegestationen (Neither thieves nor dead birds ! 74 birds of prey and 36 owls in breeding stations belonging to the German Union of Bird Conservation)
Naturwissenschaft im Unterricht - Biologie, 31, 1983, No. 5, p. 174.

Birds of prey and owls are among the most threatened species of birds. This is predominantly the fault of man; old fruit trees with hollows suitable for building nests are cut down, other natural nesting sites of birds are disappearing, various structures hinder their flight. Also tourists, photographers and mountaineers all disturb the nesting sites of large birds and the use of biocides, as well as tracer quantities of various chemicals in the soil all threaten birds. Large amounts of traffic on roads also has a negative effect on them. The German Union of Bird Conservation provides information on

where to send young abandoned birds of prey and owls and where to report illegal breeding or dead specimens. In the Saarland this organization has four breeding stations for conserving birds of prey and owls.

nature conservation - environmental conservation -
birds of prey - owls - FRG. 147396.

109. VESELINOV, G.:

Nakoy izvodi ot mezhdunarodniya opit po opasvaneto na prirodnata sreda (Some conclusions drawn from international research concerning environmental conservation)

Biologiya i khimiya, 26, 1983, No. 1, pp. 563-564.

Ecosystems are the basic functional units of living organisms found in nature. Every ecosystem which is intact has a specific equilibrium among various species so that no one species threatens the others. To conserve these self-regulatory processes in ecosystems, UNESCO, on the basis of the resolution of a congress held in Italy in 1978, has begun to organize various activities to conserve threatened species, such as some species of ants, insectivorous birds, bats and some groups of mammals. The author draws attention to the fact that in writing new textbooks these things have not been taken into account sufficiently in spite of the fact that they are very important.

nature conservation - environmental conservation -
Congress + UNESCO - Bulgaria. 147307.

110. ZUBKO, M.V.:

Shkolniki - druzya zhivotnikh (Pupils - friends of animals)

Biologiya v shkole, 57, 1983, No. 2, p. 71.

The author provides information on the voluntary work done by pupils in the forests of the Ivan Franko region in the Ukrainian SSR. Besides regular activities such as planting trees, collecting tree seeds, helping in tree nurseries, the pupils also help in cultivating fodder suitable for deer, finding dead animals, etc. Under the supervision of specialists pupils learn to know animal tracks in the forest, to identify poachers, to identify the number of animals, etc.

didactics of biology - biology instruction - Pupil independent work - hobby clubs - animal conservation - forests - Ukrainian SSR - USSR. 147313.

6.8.8 Health care education in biology instruction

111. BEHNKE, K.:

Gesundheitserziehung von der Unterstufe an - Schlussfolgerungen aus Schülerbefragungen (Health care education from the early classes of basic school - conclusions from a pupil questionnaire project.)

Biologie in der Schule, 32, 1983, No. 4, pp. 141-146. 4 figs.

Education towards a healthy life style is one of the tasks of a socialist school. It requires co-operation between teachers, the Young Pioneer Organization, the Youth Organization, parents and school

physicians. The author organized a questionnaire concerning hygiene, nutrition and daily regimen which 121 pupils filled in. The author discusses the findings and the conclusions drawn as far as biology teaching is concerned.

didactics of biology - biology instruction - health-care education - hygiene - questionnaire + pupils of 3rd, 7th and 9th classes - GDR. 147313.

112. BENATOV, R.:

Pusheneto v ichilishchna vrazst (Smoking by school-aged children)

Biologiya i khimiya, 26, 1983, No. 3, pp. 39-41.

Comprehensive studies carried out in Bulgaria in medical centers have indicated that smoking is one of the most frequent causes of various serious diseases such as bronchitis, emphysema, high blood pressure, arteriosclerosis, cancer and myocardial infarction. Tobacco smoke contains highly poisonous substances which have a general, as well as local effect on the body, accelerate the aging process and decrease people's ability to work. Therefore various measures should be taken to limit smoking and publicity against smoking should be fully developed. The article contains a number of facts which a teacher can use for anti-smoking propaganda in class.

didactics of biology - biology instruction - Health-care education - discussions - smoking - Bulgaria. 147307.

113. CHEREPOVA, R.V.:

Nekotore priemi stimulirovaniya posnavatel'nogo
interesa shkolnikov (Some methods of stimulating
cognisance interests of pupils)

Biologiya v shkole, 57, 1983, No. 5, pp. 17-18.

The cognisance interests of pupils are very important for their learning. When this is not taken into account it may lead to formalism, especially when such subjects as human anatomy, physiology and hygiene are taught. The author suggests meetings with various specialists, such as physicians, biologists, laboratory workers, nurses etc., as well as excursions to arouse pupils' interests.

didactics of biology - biology instruction -
activating pupils - excursions - meetings with
specialists - health-care - USSR. 147309.

114. Die Erlebniswelt jüngerer

(Reaching younger pupils' world of experience)

Biologie in der Schule, 32, 1983, No. 10, pp. 391-392.

Worldview components of education sometimes do not fulfill their purpose. They should stimulate the pupil's mental and emotional profile. For instance in the 5th class pupils are acquainted with the care which society provides to mothers and their children; in this context usually infant mortality rates in 1946 and at present are compared, but this knowledge can be made more emotional and thus educationally more effective.

didactics of biology - biology instruction - human
biology - health-care education - infant mortality -
GDR. 146313.

115. GEISLER, E.:

Ist die Genetik zur Entwicklung neuerartiger biologischer Waffen nutzbar ? (Can gene manipulation be used in the development of new biological weapons ?)
Biologie in der Schule, 32, 1983, No. 7-8 pp. 281-282.

Experts do not have uniform opinions concerning the question of whether genetic engineering can be made use of in new weapons. Some American experts have come to the conclusion that in this way it is not possible to gain agents causing illness which would be more dangerous than those known to exist naturally. Other experts on the other hand have expressed the opinion that the opposite is true and point to the danger of developing strains of bacteria resistant to antibiotics. Secret studies are now underway in the USA.
Health-care - education - biological weapons - genetic engineering - GDR. 147363.

116. Kriegsgefahren - Argumenten für den Biologielehrer
(The danger of war - arguments for the biology teacher)
Biologie in der Schule, 32, 1983, No. 7-8, pp. 279-280.

At the 36th conference of the World Health Organization an international panel of experts reported on the danger of thermonuclear war and its possible consequences for the life and health of the population. One of the consequences of the use of these weapons would be the breakdown of scientific, social and political structures. Also the consequence of using herbicides during the war in Vietnam are described (dioxine, one of these components, increases the number of abortions suffered by women who came into contact with the substance). In the arsenals of

the USA thousands of chemical weapons are stored, especially organophosphates and yperite. Also substances with a psychochemical effect are being developed.

didactics of biology - health-care education - Thermo-nuclear war - herbicides - chemical weapons - GDR.
147313.

117. MELICHAR, M.:

Škola a drogy (School and drugs)

Přírodní vědy ve škole, 24, 1982-1983, No. 7, pp.244-245.
Lit. 12.

The existing situation in drug abuse throughout the world requires that also our schools devote attention to this problem and contribute to the prevention of toxicomania. Pupils should be acquainted with these substances in the course of biology and chemistry instruction. Neurotropic drugs are those that can cause changes in mood, awareness and in the physical and mental capabilities of a person, as well as experiencing out of the ordinary sensations. But the repeated use of drugs leads to addiction or toxicomania. The author describes the most important aspects of this problem, the mental and physical addiction to drugs, withdrawal symptoms when their intake has been interrupted, their danger, long-term as well as short-term effects, the marked personality changes which are induced by drugs, as well as serious somatic diseases. The author discusses various kinds of drugs and their effect and distinguished hard drugs (morphine, heroin) and so-called soft drugs, such as toluene, trichloroethylene, alcohol, tobacco, analge-

tics and antipyretics. The author stresses the importance of school in this context and the educational, informative and diagnostic functions that schools have. Every instance of a pupil using drugs should immediately be reported to a child psychiatry clinic.

didactics of biology - biology instruction - human biology - health-care education - drugs - Czechoslovakia. 147313.

118. NIKITINA, A.V.:

Is opita formirovaniya uchashchikhshaya umeniy po
gigiyene uchebnogo truda (Experiences with influencing
the mental hygiene of pupils in learning)
Biologiya v shkole, 57, 1983, No. 6, pp. 21-22.

One of the opportunities for improving the quality of instruction is teaching pupils the principles of mental hygiene when they are doing their school work and other learning activities. Pupils become acquainted with these problems in the 3rd class, but later often forget what they have learnt and no longer apply this knowledge practically. During home room lessons they should be acquainted with the physiological and hygienic aspects of work. Also when studying human anatomy, physiology and hygiene, specifically such topics as the human eye, etc., the principles of mental hygiene should again be explained.

didactics of biology - biology instruction - human biology - mental hygiene + pupils - Czechoslovakia. 147313.

119. NOBLE, W.C.:

Microorganisms and Man

Journal of Biological Education, 17, 1983, No. 1,
pp. 17-20.

It is difficult to maintain textbooks abreast the developments of contemporary science. Special attention should be devoted to microorganisms, since a number of mistaken concepts and errors are connected with them, and perpetuated by the mass media, which sometimes for instance do not distinguish between bacteria and viruses. The author deals with press information concerning microorganisms, such as for instance articles on Salmonella epidemics, the Staphylococcus poisoning which occurred in 1975 in a Jumbo jet airplane, poisoning by rotten chicken in Cardiff, a typhus infection in Southampton, botulism after eating canned food, new incidences of TBC infection in young and older children, a whooping cough epidemic and the isolated incidence of diphtheria. Also reports on infectious diseases of plants and animals as reported by the daily press are discussed, such as rabies infection of foxes in France, foot-and-mouth disease and canine distemper. Among plant disease the author cites Graphium ulmi, a fungus which kills elm trees, of which 22 million have already died. To save elms, a new strain is being bred by crossing Ulmus pumila and Ulmus japonica. The decontamination of the British Isles from anthrax has already cost 15 million pounds sterling. Other interesting developments in micro-biology, which have been mentioned by the daily press include a new type of sugar which tastes sweetly but protects the oral cavity against carries, the production of gasoline

from sugar cane in Brazil, new technologies which make it possible to produce methane gas as an energy source out of waste and the building of a new plant to produce on a large scale synthetic human insulin on the basis of genetic engineering. All these items can be used in class to make biology more interesting.

didactics of biology - biology instruction - health care education - Great Britain. 147313.

120. PESCH, F.:

Humangenetik - weltanschauliche Potenzen erzieherisch wirksam machen ! (Human genetics can be used more effectively in worldview education !)

Biologie in der Schule, 32, 1983, No. 10, pp.388-391.

The basis for making worldview education more effective is the creation of a situation in which the pupils themselves become interested in worldview problems. Replies to questions of a worldview nature should not be supplied ready-made, but of course the teacher should be able to cope with the most varied questions. The author provides a number of examples concerning human genetics and such problems as whether in the future it will be possible to protect mankind against hereditary disease.

didactics of biology - biology instruction - human biology - genetics - hereditary disease - health-care education - GDR. 147313.

121. SÍBERT, P.:

Zdravotní výchova - významná součást komunistické výchovy (Health-care education - an important component of communist education)

Přírodní vědy ve škole, 34, 1982-1983, No. 5, pp. 163-165. Lit. 20.

The development of civilization has brought with it also negative influences in the environment, which threaten human health. All countries in the world are now seeking solutions to these problems. Among them are health-care education with the specific aims of disease prevention, improved mother and child care, environmental control, education towards correct nutrition, drug abuse prevention, etc. The medical sciences are now concentrating in their research on five important areas: cardio-vascular disease, oncology, mother and child care, virology and gerontology. The XVth congress of the Communist Party of Czechoslovakia also devoted extensive attention to problems of health care and stressed the importance of health-care education within the framework of the school system. The author briefly describes the history of this type of education in schools, in textbooks and in the didactics of biology since 1945. He demonstrates how educational objectives have changed as the actual situation in health care has changed.

didactics of biology - biology instruction - health-care education - communist education - history + health-care education - Czechoslovakia. 147313.

122. TARNAVSKIY, J.S.:

O vrede kureniya (On the hazard of smoking)
Biologiya v shkole, 57, 1983, No. 3, pp. 10-15.

The author discusses the problem of smoking and the addiction it leads to, its causes and consequences and the possibility of curing the addiction. The author analyses in detail the arguments of smokers that smoking is not dangerous and their claim that it improves work performance, provides a feeling of satisfaction and increases energy. He explains the physiological changes which take place in the body as a consequence of smoking and which are also the source of the addiction. The disease-provoking influence of smoking is described at the organ and at the cellular level. Also the effect of tobacco smoke on non-smokers is discussed, the negative influence of smoking on the foetus, and on small children. In conclusion the possibilities of curing the addiction and the volition aspects of the problem are discussed, as well as the aid a physician can provide in this context.

didactics of biology - biology instruction - human
biology - smoking - disease + smoking - USSR. 147313.

123. TAUBERT, E.:

Erziehung zur Gesundheit - Aufgabe und Problem der Welt (Health-care education - a task and problem of the whole world)
Biologiya v shkole, 32, 1984, No. 4, pp. 135-140.

Already J.A. Comenius formulated the requirement of health-care education. In modern socialist pedagogy this requirement has become a matter of course.

On the basis of several examples the author documents the significance of health-care education both on the national and international level. He first deals with educations towards healthy and rational nutrition, especially as far as daily quantities of carbohydrates and protein intake are concern and the significance of avoiding obesity. Then he discusses the prevention of infectious disease (including venereal disease), the danger posed by smoking and the importance of combating alcoholism.

didactics of biology - biology instruction - health-care education - nutrition - obesity - disease prevention - alcoholism - GDR. 147313.

124. TRAUTMANN, T.:

"Schädlichkeit des Rauchens" - Erfahrungen zur Studiengestaltung ("The negative consequences of smoking" - experiences with preparations for teaching this topic)

Biologie in der Schule, 32, 1983, No. 11, pp. 424-425.

Problems connected with smoking continue to be important. Experience has indicated that even 13 to 15 year-old pupils already have a developed addiction to smoking. The author describes how he deals with this problem in his biology classes. Pupils report to the class their own experiences with smoking and then the effect of nicotine on a living organisms is demonstrated experimentally and with the aid of slides and statistics.

didactics of biology - biology instruction - human biology instruction - health-care education - smoking - GDR. 147313.

126. PENNER, S.D.:

Is opita podgotovki uchitelya k gigenicheskomu i polovomu vospitaniyu shkolnikov (On teachers' experience with preparations for sex and hygiene instruction)

Biologiya v shkole, 57, 1983, pp. 24-25.

The implementation of sex and hygiene education assume that the teacher makes adequate preparations for teaching this topic. On the basis of a questionnaire which the author designed for the study of this problem a course has been prepared for teachers, as well as for students of Pedagogical Faculties. The author provides an outline of the course curriculum and the number of hours devoted to each topic. The course is for teachers in primary classes and for biology teachers.

didactics of biology - preparations + teacher - health-care education - sex education - teacher training students - USSR. 147307.

127. PUŠKÁR, B.:

Sexuální výchova a výchova k rodičovství se zaměřením na 7. ročník základní školy (Sex education and education towards parenthood with special attention to the 7th class of basic school)

Přírodní vědy ve škole, 34, 1982-1983, No. 9, pp. 326-328. Lit. 11.

Sex education and education towards parenthood are important contemporary tasks; this education should be adequate to the age of the pupils, who are still in a prepubescent stage. The subject-matter of this education should be based on the natural sciences,

civics and also other subjects, such as physical training and literature. Of course the most extensive and important role falls to biology. The teacher should also cooperate with the school physician and psychologist.

didactics of biology - human biology - health-care education - sex education - education towards parenthood - basic school - 7th class - Czechoslovakia. 147313.

128. RUMYANTSEVA, M.N.:

O zadachakh narodnogo obrazovaniya i shkol po gigenicheskomu i polovomu vospitaniyu shkolnikov
(On the tasks of the school system authorities concerning the sex and hygiene education of pupils)
Biologiya v shkole, 57, 1983, No. 5, pp. 12-23.
2 rabs.

The Ministry of Education of the USSR considers the education of healthy and physically able citizens to be one of the main tasks of the school system. Educating pupils towards an understanding of the necessity of adhering to hygienic standards and rules is one such task. Biology instruction in the 8th class has a special position in this education. The author describes a project to study the possibility of supplementing the biology syllabus for the 8th class with various other hygienic subject matter. A total of 17 problems concerning hygiene and sex education will be added to the syllabus.

hygiene - 8th class - basic school - USSR. 147307.

129. SEMERIKOVA, N.P.:

Is opita raboty škol po gigenicheskomu i polovomu vospitaniyu uchashchikhsya (Experiences in school work on hygiene and sex education of pupils)
Biologiya v shkole, 57, 1983, No. 6, pp. 18-20.

The school in which the author teaches strives to carry out sex education and hygiene education of its pupils both during lessons and during extracurricular activities. The school has an annual plan which provides for a continual education in these areas, in the correct sequence. Education begins in the 1st class, (the author cites examples) and continues especially in subject matter on anatomy, physiology and human hygiene. The author cites her own experiences and the problems she encountered and describes how she attempted to also educate parents on these problems.

didactics of biology - human biology instruction - health-care education - sex education - USSR. 147307.

130. TEMNENKO, V.I.:

Is opita raboti po gigenicheskomu i polovomu vospitaniyu uchashchikhsya v selskoy shkole (On experiences with hygiene and sex education of pupils in a rural school)
Biologiya v shkole, 57, 1983, No. 5, pp. 25-26.

The author taught a course on hygiene and sex education for two years. She analyses her experiences in this area, how she drew up a time schedule and teaching syllabus, her cooperation with physicians, the design and administration of a questionnaire after

the course had been taught and her cooperation with parents on these matters. In conclusion she cites the main problems she encountered.

didactics of biology - human biology instruction - health-care education - sex education - rural schools - hygiene education - sex education - USER. 147307.

6.9. Vocational guidance in biology instruction

131. HORSCHGEN, A.:

Employment Prospects for Biologists

The American Biology Teacher, 45, 1983, No. 7, pp. 376-378. Lit. 9, 4 tabs., 2 photos.

Among the jobs which biology graduates can hold are: teachers at various types of schools, officers in government and administrative bodies, in biological institutes and those concerned with environmental conservation, as well as in the private sector, specifically in the new bio-engineering industries. Various organizations in the USA were sent questionnaires on the number of biologists they employ. A total of 209 organizations responded, including 6 hospitals, 13 consultancy services, 18 pharmaceutical firms, 18 chemical firms, 15 firms in the petroleum industry, 37 government agencies, 22 food processing firms, 4 soos, 1 government agency, 27 other firms, 24 research institutions and 25 others. All these institutions are interested in hiring biologists.

bocational guidance - biology - questionnaire - study - job survey - biology - USA. 147313.

132. ZIPKO, S.J.:

An Interdisciplinary Approach to Forestry Education

The American Biology Teacher, 45, 1983, No. 7, pp. 387-392. Lit. 27, 8 figs.

The author describes a minicourse on forestry which takes 4 to 6 weeks and is of an interdisciplinary nature. The course includes biology and special forestry problems as well as agriculture, languages, art, law, history, sociology, mathematics and practical botany and zoology, genetics, ecology and others. The author describes the selection of students and some aspects of the practical training course which concern for instance the dating of trees (in the USA there are trees 6000 years old), etc.

vocational guidance - forestry - field work - ecology - USA. 147313.

7. The content of biology instruction

133. PHILLIPP, E.:

Planungsvorschlag zur Durchführung eines ökologischen Projektes in der Sekundarstufe II als Beispiel für einen zeitgemässen Biologieunterricht (Suggestions for the planning of an ecological project in the upper classes of secondary school as an example of devoting adequate time to biology instruction)
Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 7, pp. 215-220.

The author discusses which problems are adequate from the point of view of the didactics of biology, for teaching older secondary school pupils especially in view of modern environmental problems, which have created a situation with a number of advantages but also disadvantages and a threat to life. Environmental aspects include such world-wide problems as population growth, insufficient nutrition, growth of industry, a shortage of raw materials and environmental pollution. In this context, educational and teaching objectives should be to provide pupils with sufficient knowledge in various sciences so that they are able to form independent, critical and responsible opinions as a basis for taking decisions. The author then discusses the content of ecological instruction in school and some of the difficulties of its implementation which include the highly demanding nature of the subject-matter in terms of time and the facilities which a school must have available, as well as highly skilled teachers who are willing to try new methods of teaching a new subject-matter.

didactics of biology - biology instruction - ecology -
FRG. 147307.

7.1.1. The integration of biology and other natural
science subjects

134. MOSKOVSKA, C. - IDRIZOV, M.:

It sa integrirane uchebnoto sdrzhanie po biologiya
i khimiya na tema "Prirodnata sreda i chlovekt"

(Towards an integration of biological and chemistry
subject-matter in the topic "The natural environ-
ment and man")

Biologiya i khimiya, 26, 1983, No. 2, pp. 26-28.

The subject-matter taught in chemistry and bio-
logy in the 8th class provides opportunities to
integrate both subjects and to acquaint pupils with
the point of view of both subjects, specifically in
the following topics: the physical environment and its
influence upon the human organism and the dangers
posed by pollution of air, water and the soil. The
authors recommend three teaching lessons for each of
these topics - one provided by biology and two by
chemistry. In each lesson the stress is on the point
of view of the subject whose lesson is being held.
In conclusion of this unit the authors recommend an
excursion to a water treatment plant where both the
chemical and biological aspect can be studied.

didactics of biology - interdisciplinary relations -
integration of chemistry and biology - environmental
conservation - Bulgaria. 147313.

7.1.2. Instruction on the basis of examples and categories

135. BLUME, B.:

Projekt: Bäume in der Stadt (A school project: trees in the city)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 3, pp. 67-80.

9 figs., 1 tab., 8 worksheets

80 % of the population in the FRG live in communities with more than 5000 inhabitants. Constant mental and physical stress leads to a number of civilizational diseases. Trees in urban settings tend to improve the quality of life and also have a positive effect on people. However, the vitality of trees is threatened by environmental pollution, specifically by pollution of the air, water and the soil. The author here suggests the inclusion of a project on trees in an urban environment during one week of instruction. He himself undertook such a project with a group of 14 to 18 year old students at the Emmanuel Kant school in Neumünster. The whole project was motivated by the situation in the town; its preparation took two weeks and it was carried out in the town. Students measured the exposure of trees to dust, gases and salt (in the winter). Interdisciplinary relations were made use of to a maximum. The students also held discussions with members of the town local government, so that they became thoroughly acquainted with the problems of maintaining greenery in an urban environment.

didactics of biology - biology instruction - teaching

by examples - project - environmental conservation -
urban greenery - FRG. 147309.

7.1.3. Problem teaching

136. ČIPEROVÁ, M.:

Problémové vyučování a materiálové didaktické prostředky (Problem teaching and the use of didactical media of a material nature)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No. 7, pp. 99-100.

Problem teaching aims at acquainting pupils with methods of independent learning in new situations and to teach them a general outline according to which it is possible to solve problems. The method of presenting the problem is very important; it should be discovered and subject to analysis. Then a plan is drawn up to find a solution. Material teaching media are a source of facts and information for the pupil, they can also contribute to the forming of a problem situation, and hence make problem teaching more meaningful and effective.

didactics of biology - biology instruction - problem teaching - teaching media - logical procedures - Czechoslovakia. 147307.

137. Die Problemfindungsphase im Biologieunterricht - Anregungen zu ihrer Gestaltung (The stage of seeking a problem - instructions for its creation)
Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 5, pp. 147-149. Lit. 11.

The seeking of a problem which provides motivation and stimulus for pupils' activity and leads them to work independently is a very important stage of problem teaching. A problem can be introduced by an experiment, demonstration, provocation (where the pupils consider the demonstrated object to be threatened), by a comparison, by suitable teaching media or by discussion. For each of these methods various examples are cited which a teacher can use. The other stages of problem teaching then follow each other easily: a hypothesis is formulated or a number of them, which can then be verified or rejected on the basis of the solution of the problem.

didactics of biology - biology instruction - problem teaching - motivation - problem situations + creation - FRG. 147307.

138. DYLLA, K.:

Mit den Schnaken leben - Artenschutz statt Ausrottung ?
(To live with mosquitoes - conservation of the species or its extinction ?)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 4, pp. 109-111. Lit. 1, 1 worksheet, 1 fig.

The author describes the possibility of using the incidence of mosquitoes in the vicinity of the school for a project in problem teaching. The problem is whether mosquitoes should be entirely annihilated

or whether man should co-exist with them. Pupils participate in planning the project, they collect data, organise observations and formulate hypotheses. During a debate, various points of view are defended. The role of the teacher is limited to organising the work of the pupils and advising them. The pupils study the habitat and population of the mosquitoes, their place in systematics, the development of the larvae, their food and feeding patterns during various stages of development, abiotic factors in the environment, the regulation of their population and how to combat mosquitoes.

didactics of biology - biology instruction - problem teaching - insects - observations - experiments - FRG. 147307.

139. KEMNITZ, E. - KURZE, M.:

Hinweise zur problematischen Gestaltung der Stoffeinheit "Bau und Stoffwechsel der Sprosspflanzen"

(Klasse 9) (Instructions for a drawing up problems to be solved in teaching the topic "The structure and metabolism of the higher plants" in the 9th class) Biologie in der Schule, 32, 1983, No. 9, pp. 345-348.

In this topic the focus of creating problem situations are processes connected with the intake of water and the mutual relations between structure, function, organism and the environment which are connected with it. From a logical point of view at least four mutually interconnected problems follow: 1. the intake of water, 2. the significance of water, 3. water routes, 4. the output of water and regulation of the water metabolism of a plant. The

authors show how these problems can be dealt with in the course of 10 teaching lessons.

didactics of biology, biology instruction - physiology - problem teaching - problem situations - GDR. 147307.

140. KURZE, M.:

Durch problemhafte Unterrichtsgestaltung zu schöpferischem Denken und parteilichem Handeln erziehen !

(Education towards creative thinking and Party behaviour through problem teaching !)

Biologie in der Schule, 32, 1983, No. 7-8, pp. 285-294.

Specialists in the didactics of the natural sciences from the Humbolt University in Berlin, together with teachers, have organised a long-term pedagogical experiment which clearly indicates the contribution made by problem teaching and its significance. The aim of this article is to draw generalized conclusions. Problem teaching can be assessed from an educational, philosophical and worldview aspect and in relation to production, technology and economics, life styles, ideology and ethics. The author devotes special attention to heuristic aspects of observations and experiments and the linking of knowledge in the natural sciences to ideological and moral aspects. Another important aspect is developing pupils' interests in the natural sciences and the practical use of what they have learnt. Group creative thinking should be made use of in problem teaching, as well as in discussions.

didactics of biology - biology instruction - problem teaching - philosophical aspects - worldview opinions - GDR. 147307.

141. SKODA, M.:

Vorschläge zur problemhaften Gestaltung des Unterrichts - dargestellt an Beispielen für Klasse 9

(Suggestions for a problem approach to teaching - on the basis of examples from the 9th class)

Biologie in der Schule, 32, 1983, No. 7-8, pp. 295-298.
1 fig.

The author provides suggestions for teaching two topics in the form of problem teaching: The structure and metabolism of the higher plants (nutrients of autotrophic plants) and the metabolism of plant cells (the dissimilation of plants). For each topic, its possibilities are analysed from the point of view of creative thinking and worldview education, as well as from the point of view of teaching media and providing instructions for the planning of successful teaching lessons.

didactics of biology - biology instruction - problem teaching - botany - GDR. - 147307.

142. ŠUCHA, J.:

Samostatná práca žiakov v prírodovede (Independent work by pupils in the natural sciences)

Učební pomůcky ve škole a osvětě, 22, 1982-1983,
No. 1, pp. 6-7. 4 figs.

The teaching syllabus for the 1st class of basic school already assumes the use of logic, as well as modern methods of work and organization. The purpose of independent work is to develop in pupils the ability to solve problems, deal with problem situations, etc. The natural sciences in basic school include subject-matter from physics, chemistry, biology

and geology. In the 3rd class of basic school pupils can already participate in solving problems within the framework of various projects. The article cites examples concerning geology.

didactics of biology - biology instruction - natural science instruction - basic school - problem teaching - Czechoslovakia. 147313.

143. DORRER, H.:

Wie wird Wesentliches wesentlich für jeden Schüler ?

(How can basic subject-matter in teaching really be basic ?)

Biologie in der Schule, 32, 1983, No. 10, pp. 392-396.
2 figs.

Basic subject-matter does not exist in itself, but is such always from a specific point of view, at a specific level of significance. Hence basic subject-matter should always be taught in a specific context. Its quality defines the quality of cognizance, as well as the quantity of signs which define the subject of the cognizance. Theoretical postulates are made specific on the basis of the example the structure of roots and the structure of an insect's body; the author cites practical examples.

didactics of biology - biology instruction - instruction by examples - basic subject-matter - GER. 147307.

144. NOVÁK, V.J.A.:

Evoluční přístup v biologických vědách (An evolutionary approach in the biological sciences)
Přírodní vědy ve škole, 34, 1982-1983, No. 6, pp.203-205.
Lit. 19.

Various approaches towards biology can be used. Some approaches are common for a number of sciences. The author cites the following types of these approaches: descriptive, experimental, mathematical, logical, system and evolutionary. The latter is especially significant for biology. In recent years evolutionary biology has been developed throughout the world. This science uses various scientific methods: deduction, synthesis, comparative method, historical method, the unit method, etc. Among special methods used by this science are determining the selective value of individual evolutionary changes (mutations), determining stages in the phylogeny of given groups of organisms or the development of their specific structure, which is important for their further development and spreading, the recapitulation method which is based on Darwin and Haeckel and the method of systemising and classifying individual aspects of an organism.

didactics of biology - biology - scientific method +
biology - Czechoslovakia. - 147365.

7.3. Dividing teaching subject-matter into various classes. The principles of ordering the subject-matter into a didactical system. Differentiation in biology instruction

145. BECKER, H.:

Differenzierung im Biologieunterricht - Erfahrungen mit pädagogischen Möglichkeiten (Differentiation in biology instruction - experiences with pedagogical opportunities)

Biologie in der Schule, 32, 1983, No. 10, pp. 377-384.

The possibilities of differentiating biology instruction have not been studied thoroughly and moreover are usually limited to working with pupils who are poor achievers. The author is of the opinion that differentiation is a comprehensive requirement which concerns all aspects of instruction. First, already in the planning of class work it is necessary to determine in which stage of the teaching process differentiation should take place and how. In the next stage pupils receive differentiated tasks and problems for solving. When new subject-matter is learnt, various speeds of acquiring new knowledge by different pupils should be taken into account. Also strengthening what has been learnt and repetitions, as well as an application of what has been learnt in practical exercises can be carried out in a differentiated manner. One of the most important means of differentiation is giving pupils variously difficult assignments.

didactics of biology - biology instruction - differentiation + instruction - teaching methods - GDR.
147307.

146. HOMOLA, J.:

K problematice vztahu vědního a didaktického systému

(On the problem of the relationship between the scientific and didactical system)

Přírodní vědy ve škole, 34, 1982-1983, No. 4, pp. 122-124. 2 figs., lit. 18.

An important problem of contemporary methodology is the introduction of new scientific findings into didactical system at a quantitative and qualitative level. A didactical system should not be considered a micro-model of the scientific system. The most difficult problem in this context is finding the best method for transforming one system into the other. This is the area covered by specialized didactics. A didactical system also has other objectives: the influencing of the personality and world-view education - to name only the most important. Others include the forming of the pupil's intellect and his moral and aesthetical profile. A scientific system provides the didactical system with a large number of facts. The didactical system of course has a time lag in relation to the scientific system. The author deals with this problem from a historical point of view and comes to the conclusion that while the old didactical system is ceasing to be valid due to the development of science, a new one has not yet been created.

didactics of biology - biology instruction - scientific system - didactical system - selection of subject-matter - Czechoslovakia. 147319.

147. TOMCZAK, R.:

Hospitiert und kommentiert - differenzierte Unterrichtseinheit (Differentiated teaching - comments on the basis of visits to classrooms)

Biologie in der Schule, 32, 1983, No. 1, pp.423-424.

The author is a district specialist for biology teaching methodologies. He describes his visits to classrooms to assess biology classes on the topic Health nutrition, where the pupils not only learn new facts, but also form correct attitudes and ethical convictions. Pupils also did differentiated work, on the basis of using various journals. The author describes the structure of the lesson in detail.

didactics of biology - biology instruction - healthy nutrition - differentiated class work - GDR. 147307.

148. ADELT, B.:

Bemerkungen zur Gestaltung des Verhältnisses von Einheitlichkeit und Differenzierung im Biologieunterricht (Comments on the relationship between unity and differentiation in biology instruction)

Biologie in der Schule, 32, 1983, No. 12, pp. 478-479.

The differentiated teaching of biology is a modern requirement and also a current problem. However, the unity of instruction is a principle which is

higher than that of differentiation. In differentiation the age specific characteristics of the pupils are taken into account, as well as their specific personality traits and specific territorial conditions. The author discusses this problem from various points of view and describes various aspects of differentiation.

didactics of biology - biology instruction -
differentiated instruction - GDR. 147313.

149. ALTMANN, A. - LIKOVÁ, E. - VILČEK, P.:

Posnámky k práci s učebnicí Přírodopis 6

(Comments on the use of the textbook Nature Studies
for the 6th class of basic school)

Přírodní vědy ve škole, 34, 1982-1983, No. 4,
pp. 125-129. 2 figs., 2 tabs., lit. 9.

The authors of this zoology textbook here offer comments on the use of the textbook in classwork, as well as the method used by the book, how it was written and experimentally verified. The new textbook fulfills its basic purpose - to modernize instruction. It is based on the systematics of the animals kingdom and takes into account the morphology, physiology, embryology, ecology and zoogeography of animals. For each systematic unit a didactical model of one animal is taught and to this a small sample of other animals from the unit are added to provide an idea of how systematics have developed. Insects are described according to their ecological systems. Domestic representatives of fauna are given priority and foreign representatives are included in special chapters. Special attention is given to economically important animals. The pictures have been uniformly done by the

painter Z. Berger, who usually provides an image of the whole habit^{at} as well as separate anatomical and morphological pictures, etc. The end leaves contain pictures of protected and threatened species of animals. The text includes summary tables, descriptions of the illustrations, questions and assignments. The most important modern aspect of the textbook is the creation of zoological terms which require the use of logical procedures, analysis and synthesis, induction and deduction, comparisons, generalizations, structuring and systemization. All terms and notions are explained the first time they are encountered in the text. The textbook is accompanied by modern teaching aids, which include transparencies and pictures for use with a magnetic board, as well as cassette films. Special attention is devoted to the forming of definitions, which are summed up by tables and shown on pictures. Special tables show the creation of the terms artiodactyle, ruminants and molluscs. In conclusion the authors demonstrate the meaning of a didactical field, which includes all terms which pupils may encounter when they learn a new term. Also an example of a map of various notions is shown.

didactics of biology - biology instruction - modernization of instruction - zoology textbook - Czechoslovakia. 147311.

150. GOLLE, B. - KAISER, G.:

Zum aktuellen Thema, Zwischenbilanz der Diskussion zum Entwurf des überarbeiteten Lehrplans Biologie Klasse 10 (On a current topic. A tentative assessment of the discussion concerning the draft teaching syllabus for biology for the 10th class)
Biologie in der Schule, 32, 1983, No. 6, pp. 248-257.

The discussion concerning the new biology teaching syllabus for the 10th class was very interesting; a total of 40 authors participated, most of them teachers, specialists in methodology and philosophers. The authors assess the contribution of various participants in the discussion and attempt to formulate conclusions on the structuralization of the subject-matter, on the cognizance process and the relationship between the amount of time available and the topics taught, as well as the worldview education of pupils, and the activities of pupils in learning.

didactics of biology - biology instruction - 10th class - teaching syllabus - discussion - GDR. 147307.

151. Kak prepodavat' material rekomandovannyi usovershenstvovannoy programmy k izucheniyu v oznakomitel'nom plane (How to teach subject-matter recommended by the improved teaching syllabus for inclusion into the plan of supplementary problems)
Biologiya v shkole, 57, 1983, No. 6, pp. 16-17.

On the basis of frequent queries by teachers about how to use the improved teaching syllabus, two specialists in the didactics of biology from the Academy of Pedagogical Sciences provide various answers and advice. The new syllabus has deleted highly

complex but redundant parts of the previous syllabus, as well as a number of experiments and demonstrations which did not have a clearly educational purpose. Stress is placed on fundamental subject-matter. Subject-matter which is included into the supplementary plan does not have to be learnt by the pupils and does not have independent lessons devoted to it. Rather it is added to what the pupils should learn as supplementary material. Various examples from general biology, botany and zoology are cited.

didactics of biology - biology instruction - modernization - teaching syllabus - USSR. 147307.

152. ¹BAKER, G.:

Zum aktuellen Thema: Für und wider - zum Entwurf des überarbeiteten Lehrplans für Klasse 10 (On a current topic: Arguments for and against the draft of the rewritten teaching syllabus for the 10th class) *Biologie in der Schule*, 32, 1983, No. 2-3, pp. 102-108.

The author is a biology supervisor at the regional level. After studying the draft of the new biology curriculum he comments the new structuralization of biology subject-matter taught on genetics, phylogeny and for practical activities of pupils. He specifically discusses worldview education aspects and the division of topics into individual lessons, as well as the amount of time allotted to various topics.

didactics of biology - biology instruction - modernization + biology curriculum - discussions - GDR. 147307.

153. ROŠICKÁ, L.:

K nové koncepci výuky přírodopisu v 7. ročníku základní školy (On the new concept of natural science education in the 7th class of basic school) Přírodní vědy ve škole, 34, 1982-1983, No. 1, pp. 3-6.

The teaching syllabus for the 7th class of basic school includes human biology and a final part on general biology. Instruction in the 7th class is very important, because pupils who are undergoing puberty learn about the anatomy and physiology of the human body, as well as about health-care principles and hygiene. They also learn about correct nutrition, mental hygiene, etc. All components of communist education are present in this curriculum. The biology teaching syllabus continues in the subject-matter of preceding classes, where botany and zoology were taught. The 7th class syllabus is divided into 12 topics on human biology and 4 on general biology for which a total of 54 lessons in class and 4 lessons for laboratory work in human biology and 16 lessons of laboratory work for general biology are available. The textbook stresses independent work and contains a number of motivating questions. Illustrations have often replaced purely descriptive sections and tables provide surveys. Teaching methods used in class include discussions, use of textbook, observations, problem teaching and of course classical methods such as the use of various aids such as models, mounted specimens, slides, transparencies, wall pictures, films, etc. Interdisciplinary relations are stressed in relation to history, physics, physical education, chemistry, civics, special courses for girls and work on a school plot of land. Hobby club

activities include first aid teams, nature conservation clubs, microbiology exercises, etc. A chemistry and biology practical exercise which is an elective course has its own teaching syllabus which does not contain subject-matter on human or general biology.

didactics of biology - biology instruction - basic school - 7th class - human biology - general biology - interdisciplinary relations - teaching aids - hobby clubs - Czechoslovakia. 147307.

154. SZARSKI, H.:

Wiadomości o zdrowiu w programie biologii (Health care education in the biology curriculum)

Biologia w szkole, 36, 1983, No. 1, pp. 23-28.

Lit. 16.

The Polish Academy of Sciences has published a special report on the health of society. The tasks of health care education in schools are specifically stressed and it is strongly recommended that this education be extended. The report criticises biology teachers and those who have drawn up and introduced into schools existing biology teaching syllabi and goes so far as to demand that health care and hygiene be taught by physicians in schools. The author of the article expresses his disagreement with this demand, because experience has indicated that all such attempts have failed in view of the fact that ^{the task of} physicians is to treat patients and not to deal with the relationship between a person and his environment. In biology, pupils become acquainted with the negative effect the environment can have on human health, beginning with the foetus, until old age, they become

acquainted with the consequences of the use of insecticides, herbicides, artificial fertilizers etc., as well as dangerous industrial processes and pollution of air, water and the soil. Also the dangers of drug abuse are taught. The author stresses the personal example set by teachers who themselves do not smoke or drink.

didactics of biology - human biology - hygiene - health-care education - biology teachers - Poland. 147313.

7.9. Endeavours for modernization in biology instruction

155. BECKER, H.:

Spezialkurs Biologie 3.6 "Mikrobiologie" in Muhlhausen
(A special "Microbiology" biology course (3.6.) in Muhlhausen)

Biologie in der Schule, 32, 1983, No. 2,3, p. 111.

The Dr. Theodor Neubauer Pedagogical Faculty in Erfurt - Muhlhausen has for several years been organizing special courses on microbiology which concern current problems of applied microbiology, the use of microbes in various biotechnologies and the theoretical foundations of medical microbiology. Excursions to a dairy plant, a hygiene institute, etc. are a part of the course.

didactics of biology - biology instruction - modernization + instruction - microbiology - GDR. 147317.

156. CHRUSZCZEWSKA, B.:

Kierunki modernizacji programu biologii w liceum ogólnokształcącym (Trends in the modernization of the biology curriculum in general education secondary schools)

Biologia w szkole, 36, 1983, No. 1, pp. 15-17.

In January 1982 the Polish parliament approved a reform of the whole national school system; the Ministry of Education has been entrusted with the implementation of this reform which includes also a modernization of the curriculum, of teaching methods, as well as changes in the educational and teaching objectives of the school system. As a point of departure, an analysis has been carried out of world trends in biology instruction and of the negative aspects of existing curricula and teaching syllabi used in Poland. The author reports also on a questionnaire project in which 92 biology teachers and specialists in the didactics of biology participated. In their opinion, the modernization of school syllabi and curricula should reflect the wishes and values of the whole nation, the progress of the scientific and technological revolution, the development of the biological sciences, as well as new trends in biology teaching and the didactics of biology, psychology and pedagogics.

didactics of biology - biology instruction - modernization + instruction - teaching syllabi and curricula - Poland. 147307.

Vzmoshnost za intensifikatsiya na obuchenieto po biologiya v sedmi klas (Opportunities for the intensification of biology instruction in the 7th class) *Biologiya i khimiya*, 26, 1983, No. 3, pp. 27-33. Lit. 10, 1 sketch.

Much can still be done to increase the intensity of learning by pupils. The author shows this on the basis of an example from the biology teaching syllabus for the 7th class about the external structure of a carp's body. She discusses possible approaches to this topic and describes a project in which she divided her pupils into two groups - an experimental and a control group. While the control group was taught in a traditional fashion, the experimental group was taught on the basis of a new method, based on the following: 1) the theory of reflections, 2) associative theory, 3) the theory of forming skills in stages, 4) the requirement of the use of dialectical and formal logic and a system of didactical principles. The new method of teaching gradually taught new notions and terms, such as vertebrate and fish. Pupils learn about the supporting structures of a carp's body, its skeleton, the articulation of the spinal cord and its function. Further knowledge specifies the characteristics of the carp. At the completion of the course pupils were given a test which clearly demonstrated that the use of logical procedures contributed to the intensification of the learning process.

didactics of biology - biology instruction - modernization + instruction - zoology - fishes - Bulgaria.
147309.

158. LEGKOVA, K.R.:

Emotsionalnaya nasyschennost uroka kak sredstvo
aktivizatsii poznavatelnoy deyatel'nosti uchashchikh
(An emotional component in a school lesson as a means
of activating the cognitive activities of pupils)
Biologiya v shkole, 57, 1983, No. 1, pp. 37-39.

The author points out the opportunities provided by making use of emotional impacts in biology lessons. He uses music, poetry, the reproductions of paintings, quotations, etc. and includes them in an organic manner into the topics being taught. For instance each teaching unit has its introductory motto. This not only motivates pupils but leads to the activation of a number of objectives, such as love of the motherland, strivings to conserve nature, etc. The author cites a number of example when he included works of art into the teaching of biology.

didactics of biology - biology instruction - teaching lesson - aesthetical education - modernization of instruction - USSR. 147309.

159. SMAŽEK, A.:

Historický význam únorových dnů 1948 (The historical
significance of February 1948)
Přírodní vědy ve škole, 34, 1982-1983, No. 6, p. 202.

A political editorial at the occasion of the anniversary of the February events in 1948 when the struggle between the working class and the bourgeoisie in Czechoslovakia culminated and the road to socialist changes in this country was definitively opened. The author shows that February 1948 positively influenced not only the political and economic development of the

country but also modernized education, led to the creation of a unified school system, the democratization of education, a reform of university education, the creation of the Czechoslovak Academy of Sciences in its present form, etc.

modernization + education - February 1948 - Czechoslovakia. 147313.

160. ZAWADSKA, W.:

Dyskusja nad modernizacja programu dla LO

(A discussion concerning the modernization of the curriculum in general education secondary schools)
Biologia w szkole, 36, 1983, No. 1, pp. 18-25.

The author cites the outcome of a discussion on the draft of a new biology curriculum for general education secondary schools. Each branch of these schools is to have its own biology curriculum, in spite of the fact that in each the basic elements of the structure for providing a general education in biology will be maintained. Each curriculum should be accompanied by a list of requirements and standards of knowledge and skills. Problems concerning environmental control and conservation should be integrated into the whole course. Sections on ecology and human hygiene should be extended and improved in quality. Methodological handbooks for teachers should be produced to accompany all textbooks. Also atlases for pupils should be produced. Evening classes for adults should have a different curriculum for biology, with greater stress on Darwinism and a larger relative number of lessons for biology. In conclusion a survey of the changes which are being prepared for the let

and 4th classes of general education secondary schools is provided.

didactics of biology - biology instruction - general education secondary schools - modernization + curriculum - Poland. 147307.

8.2. The didactical principle of combining school work with every-day life. The regional and current principle

161. BROZIO, C.:

Zum aktuellen Thema: Lebensverbundenheit des Unterrichts über "Richtige Ernährung und Hygiene des Verdauungssystems" - Erfahrungen und Vorschläge

(On a current topic: Combining instruction and everyday life in the topic "Rational nutrition and the hygiene of the digestive system" - experiences and suggestions)

Biologie in der Schule, 32, 1983, No. 10, pp. 373-377.

In teaching this topic, pupils should be guided towards using what they learn in their everyday life. It is important to know the basic habits that pupils have already acquired as far as nutrition is concerned. The author suggests distributing a simple questionnaire to learn about these problems. In dealing with this subject in class, questions should be allowed and elements of problem teaching can be introduced. This is a topic pupils will be very much interested in and which is important from the point of view of their healthy development.

didactics of biology - biology instruction -
didactical principle - activation of pupils -
nutrition - GDR. 147309.

162. FUFAYEV, A.A.:

Ispolzovanie kraevedcheskogo materiala pri izuchenii
temi "Klass Ptitsy" na urokakh zoologii (Making use
of regional material when studying the topic "The class
of aves" in zoology lessons)
Biologiya v shkole, 57, 1983, No. 2, pp. 36-38.
Lit., 2, 2 tab.

When considering the knowledge which pupils should have in zoology, the need to increase the amount of knowledge concerning the relationship between animals and their environment is often stressed, as well as the need to know local species of fauna. Both these ends can be achieved by using regional material. The author describes his own experiences in this area, gained especially during excursions and field trips and in work with a zoology hobby club. He describes the collection of such material and its identification and classification. The outcome of observations can be summed up in tables and albums of photographs can serve as a teaching aid. The author also describes lessons devoted to the material collected. Since the pupils themselves did the collecting and mounting they are usually very active during such lessons and they also develop a positive attitude to their native region.

didactics of biology - zoology instruction -
collection of material - photographs - pupils
activity - USSR. 147313.

163. KAPITANCHUK. V.A.:

Yarkiy primer sodushestva uchonikh so shkolnikami
(A wonderful example of friendship between pupils
and scientists)

Biologiya v shkole, 57, 1983, No. 5, pp. 69-71.

An good example of very good cooperation between a scientific institute and a school is the creative cooperation which has been going on for several years between the Mironovsk Institute and the school where the author is a teacher. The members of the staff from the Institute, which is famous for its breeding of selected wheat strains, often visit the school and acquaint pupils with their work. The author discusses various aspects of this cooperation, as well work on the school plot of land, the help provided by the Institute for stocking the school stockroom of biology teaching aids, etc.

didactics of biology - cooperation between school and scientific institute - USSR. 147313.

164. Nastroy na dela (An orientation towards work)

Biologiya v shkole, 57, 1983, No. 2, pp. 3-6.

An editorial which deals with the importance of the Soviet school system and its close links to every-day life. One of its most important current tasks is to intensify the ideological activities of teachers in educating their pupils towards patriotism and internationalism and in developing their responsibility and discipline, as well as their political, social and work activities. The article further develops the methodological instructions provided by the Ministry of Education of the USSR, as well as

the speeches of the general secretary of the Communist Party of the Soviet Union, J.V. Andropov. Attention is paid to methods of patriotic and internationalist education in natural science and mathematics lessons and to problems of work outside the classroom and the participation of pupils in fulfilling the instructions of Party resolutions as far as socially beneficial labour is concerned.

didactics of biology - biological principles - linking school and every-day life - socially beneficial work - USSR. 147313.

165. PESCHEL, S.:

Arbeits- und Betriebserfahrungen der Schüler in den Biologieunterricht einbeziehen ! (Let us make use of work and operational experiences of pupils during instruction !)
Biologie in der Schule, 32, 1983, No. 5, pp. 184-188.
2 tabs.

Pupils' work experiences usually concern work in agriculture where pupils work in cow sheds, poultry farms, etc. belonging to collective or state farms. They undertake work which is usually clearly connected with biology. This is especially true of physiology and ecology (in the 9th class), as well as genetics and animal breeding (in the 10th class). On the basis of the example of two teaching lessons, the author shows the links which exist between pupils' biology studies and their practical work and the possibility of practically making use of what they learn in school, as well as the educational and teaching objectives which are served by this practical work.

didactics of biology - biology instruction - didactical principles - linking school and every-day life - combining theory and practice - GDR. 147313.

166. PESCHEL, S.:

Führungsmassnahmen zur Gewährleistung der Lebensverbundenheit und Praxisbezogenheit des Biologieunterrichts (Measures to assure the linkage between biology instruction and practical every-day life)
Biologie in der Schule, 32, 1983, No. 4 pp.166-168.

Since 1978 the author has been striving to combine biology instruction with practical every-day life. The basis for this is a thorough knowledge of the factories and other enterprises found in the vicinity of the school to which excursion can be organised and discussions with their staff prepared. It is also important to gain knowledge of the workplace of pupils when they participate in this activity.

didactics of biology - biology instruction - didactical principles - linking school and every-day life - combining theory and practice - GDR. 147309.

8.6. The didactical principle of combining theory and practice

167. BREZMANN, S.:

Wie kann man Schüler zum Anwenden ihrer Kenntnisse befähigen ? (How can pupils be guided towards an application of the knowledge they have learnt ?)
Biologie in der Schule, 32, 1983, No. 12, pp. 480-484.

Practical experience has indicated that pupils have difficulties in dealing with those assignments in which they are asked to apply what they have

learnt, especially when the task is formulated in a somewhat different manner than during instruction. The author discusses how this situation can be improved, on the basis of the example of classes in the 9th grade. The type of tasks and assignments in application which the author has in mind are predominantly in written form and include such problems as describing food chains, etc. Also observations and experiments can be used for this purpose. The author cites a number of practical assignments which can be given to pupils in order to strengthen their learning.

didactics of biology - biology instruction -
combining theory and practice - learning + application -
GDR. 147309.

8.7. The didactical principle of taking into account
the individuality of each pupil

168. BRUNNER, U.:

Verantwortungsbewusstsein gegenüber Geschädigten -
ein Erziehungsziel des Biologieunterrichts

(Responsible behaviour towards handicapped persons -
one of the educational tasks of biology instruction)
Biologie in der Schule, 32, 1983, No. 4, pp.146-150,
2 tabs.

The socialist school system must also provide education for handicapped children. But our behaviour towards the handicapped should not be based only on pity. The following principles should be followed in life with handicapped persons: each handicapped person has the right to develop his own personality and

help should be offered only when a specific situation requires it: every healthy person should behave in a natural manner and without prejudices when dealing with handicapped persons. These principles are especially important in the following activities: providing aid, conservation, protection, care. In the course of teaching, stress should not be put on an achievement of perfection, but rather on explaining basic values inherent in socialism (such as friendship and cooperation, mutual help, solidarity). The author provides a number of examples from the biology syllabus for the 8th class.

didactics of biology - biology instruction - 8th class - basic school - didactical principle - individual approach - handicapped persons - GDR. 147309.

169. MARTIN, T.:

Jeden Schüler erreichen - Erfahrungen und Vorschläge

(Attention should be devoted to each pupil - experiences and suggestions)

Biologie in der Schule, 12, 1983, No. 11, pp. 430-434.

Experience with teaching indicates that the achievement of many pupils is not in accord with their potential, that the quality of learning is not permanent and also that the development of the pupil's personality is not in accord with postulated educational and teaching objectives. One of the causes of this situation is a negative attitude of pupils towards learning, a lack of knowledge on their part concerning educational and teaching objectives, as well as a lack of knowledge of fundamentals, lack of opportunities for discussion, etc. These conclusions are the outcome

of an analysis of responses given by pupils. On the basis of the example of subject-matter concerning plant anatomy and physiology the author demonstrates how the situation can be improved.

didactics of biology - biology instruction - botany - didactical principles - individual approach - pupils - GDR. 147309.

170. MEWES, A.:

Stoffwechselprozesse mit Hilfe von Modellvorstellungen verständlich machen - aber wie ? (How can metabolism processes be made more clear on the basis of modelling ?)

Biologie in der Schule, 32, 1983, No. 10, pp.396-398. 5 figs.

Didactical simplifications and the use of models in the topic photosynthesis represent an important problem for the biology teacher. First of all interdisciplinary relations must be taken into account especially towards chemistry; for instance for explaining the activation of chlorophyll the notion of a catalyst can be used, as well as the notion of redox reactions, etc. The author also suggests the use of diagrams which are cited in the article.

didactics of biology - biology instruction - didactical principles - individual approach - pupils - interdisciplinary approach - plant physiology - GDR.

8.8. The didactical principle of taking into account interdisciplinary relations

171. ADEL, B. - KELLER, U.:

Zur Nutzung von Produktionserfahrungen im Biologieunterricht (On the utilization of production experiences in biology instruction)

Biologie in der Schule, 32, 1983, No. 2-3, pp. 97-98.

Biology instruction should take into account interdisciplinary relations towards polytechnical subjects taught in school. The purpose of this article is to demonstrate that such relations can be made use of, especially in the 9th class. The author first describes how biological knowledge can be used in polytechnical subjects and vice versa, how in biology instruction use can be made of experiences gained in polytechnical education.

didactics of biology - biology instruction - didactical principles - interdisciplinary relations - polytechnical subjects - 9th class - GDR. 147309.

172. REUTER, C.:

Effektive Gestaltung des Wehrunterrichts durch Nutzung fachübergreifender Aspekte des Biologieunterrichts (Effective approaches to defence education instruction on the basis of utilizing interdisciplinary relations in biology instruction)

Biologie in der Schule, 32, 1983, No. 2-3, pp.83-88.
11 figs.

The author first analyses the objectives of defence education in basic schools in the GDR and

points out that very often the subject-matter touches upon biological problems. For this reason biology teachers who teach in the 5th to 9th classes should know more about the teaching syllabi for defence education for the 9th and 10th classes. As an example of the relations between defence education and biology the author cites protection against the effects of nuclear weapons, chemical and biological weapons, etc. Also pictures for use on transparencies are provided. didactics of biology - biology instruction - interdisciplinary relations - defence education - GDR. 147313.

8.9. The didactical principle of hygienic and safe biology instruction

173. BORROWS, T.F.:

The hazards of some chemicals used in biology teaching
The School Science Review, 65, 1983, No. 231,
pp. 299-301. Lit. 11.

The use of some chemicals in biology instruction pose a hazard for both teachers and students. But on the other hands chemicals are required for the mounting, preservation and making of microscopic and other specimens. The author provides a list of dangerous chemicals, describes their use and how and when they may be dangerous. They include benzene, benzidine, chlorohydrocarbons, colchicine, Fehling's solution, methanol, formol, Millon's reagent, ninhydrine, osmium tetroxide and various pesticides. The author discusses safety standards and hygienic rules for handling these chemicals.

didactics of biology - biology instruction - didactical principles - safety and work hygiene - chemicals - Great Britain. 147309.

9. Methods of biology instruction

174. HOUSE, K.:

Improving student writing in biology

American Biology Teacher, 45, 1983, No. 5, pp. 267-270.
Lit. 6. 4 photos.

The author discusses his own teaching experiences at a high school in Huntington which has a centre for written biology programs where students work independently and write up their laboratory reports. The centre also has student-tutors available, who have been trained for this purpose to help younger students. In the author's opinion more attention should be paid to students' written reports on laboratory work, as well as their reading. Specific examples of the importance of teaching students to write clearly, in good English and in such a way that all relevant facts are cited, are shown on the basis of samples of students' writing about a laboratory assignments to distinguish the protozoa Didinium and Paramecium.

didactics of biology - biology instruction - teaching medium - notes - essays - drawings - USA. 147311.

175. PETROVA, H.:

Intensifikatsiya na obuchenieto po biologiya
(Intensification of biology teaching)

Biologiya i khimiya, 26, 1983, No. 5, pp. 34-38.

The author first dwells on the term intensification in school work, cites the approach of various authors to this notion and gives reasons why she considers N. Charakrov's definition to be the best. According to this author intensification is "a quantitative jump in the technology and organization of work through which higher efficiency is attained". An important prerequisite for the intensification of teaching is the correct selection of subject-matter to be taught. This optimization of teaching subject-matter can be assured by the purposeful implementation of interdisciplinary relations on both a vertical and horizontal plane. Another factor is a correct choice of teaching methods, which the author discusses at length, in connection with increasing intellect demands made upon pupils. In conclusion the author discusses what is meant by the increased "biologization" of instruction, which he considers to be the development of a person's creative powers which will enable him to rationally and emotionally judge the beauties of nature and the processes which take place in it. The problems connected with the intensification of biology instruction are complicated and perhaps even debatable, but they require solutions as quickly as possible, on the basis of ideology, economics and pedagogics.

didactics of biology - biology instruction - intensification - modernization - Bulgaria. 147307.

9.6. Method of work with literature (textbook, syllabus, workbook, worksheet, atlas, atlases and keys for determining flora and fauna)

176. BOLAY, E.:

Eine unkonventionelle Einführung in die Systematik in Klasse 5: "Autosortieren" (An unconventional introduction to systematics in the 5th class: The classification of automobiles)
Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 1, pp. 1-8, 4 worksheets, 2 figs., 4 tabs.

The author describes an unconventional method of acquainting pupils with taxons and systematics. Instead of plants, whose systematics are difficult, the author uses an automobile as a model for creating a systematic classification. Also the notion of an artificial system is demonstrated with automobiles, where an artificial criterion for classification can for instance be price. Then pupils draw various parts of a plant (stem, leaves, petals, roots) and become acquainted with various plant families and the method of their classification.

didactics of biology - biology instruction - practical exercise - systematics - plant classification - FRG, 147309.

177. BULIŘOVÁ, S.:

Práce s určovací literaturou v přirodopisu v 5. ročníku základní školy (Work with reference books for identifying natural objects in science instruction in the 5th class)

Přirodní vědy ve škole, 34, 1982-1983, No. 1, pp. 9-10.

The teaching syllabus for the 5th class of basic school includes a section on learning to identify plants on the basis of a Key for the identification of flora. This skill is strengthened during laboratory exercises. In the author's opinion the Key used is adequate to the young age of the pupils. She describes in detail the organization of the laboratory exercises and selection of suitable plant material.

didactics of biology - biology instruction - botany - teaching method - work with literature - Key for identification of flora - laboratory work - Czechoslovakia. 147309.

178. GERLACH, M.:

Zum Wert von Bestimmungsübungen (On the value of exercises to identify natural objects)

Biologie in der Schule, 32, 1983, No. 5, pp. 205-206.
2 tabs.

Practical exercises in which pupils learn to identify natural objects contribute to an extension of their knowledge of the species, their logical thinking, as well as their ability to express facts verbally. It also contributes to an awareness in the area of nature conservation. If all this is to take place, however, the teacher should seek other opportunities for this type of activity than those cited in the textbook and teaching syllabus. The author

describes two identification exercises with various grasses and with molluscs, which are taken from older textbooks and can be used for this purpose.

didactics of biology - biology instruction - work with books - Key for identification - GDR. 147313.

179. HAHN, M.:

Zum Einsatz von Arbeitsblatt und Schulbuch. Aufgezeigt an praktischem Beispiel des Biologieunterrichts.

5. - 6. Jahrgangsstufe (The use of worksheets and textbooks - on the basis of the example of practical exercises in biology in the 5th and 6th classes) Naturwissenschaften im Unterricht - Biologie, 21, 1983, No. 5, pp. 165-170. Lit. 7, 5 figs., 3 worksheets.

The use of the textbook in conjunction with worksheets leads to greater activity on the part of the pupils and places them into the centre of the teaching process. It also makes it possible to utilize in an optimum manner pupils' independent work. The author assesses the significance of the joint use of worksheets and textbooks, but also criticizes their too extensive use. He analyzes separately the didactical function of a textbook and a worksheet and then discusses the advantages of their joint use and at which stage of instruction this should occur.

didactics of biology - biology instruction - instruction method - work with textbook - textbook + worksheet - FRG. 147309.

180. HASS, G.:

Zielstellungen, Erfahrungen und Hinweise zur Vermittlung von Sippenkenntnissen in Klasse 11 (Objectives, experiences and references concerning the transmission of knowledge on the species in the 11th class)
Biologie in der Schule, 32, 1983, No. 5, pp. 199-200.

According to the biology syllabus for the 11th class pupils should extend their knowledge of the systematics of flora and fauna. Knowledge of individual species are not only a component of general education, but are also important from a practical point of view - to be able to identify pests, crop plants, domestic animals, protected species, etc. The author describes his own experiences with this type of class work and provides various recommendations.

didactics of biology - biology instruction - work with books - teaching methods - identification of flora and fauna - Key for identification - GDR.
147309.

181. KEMP, D.M.:

What's In a Name ? Some Thoughts in Favour of Biological Identification.

The School Science Review, 64, 1983, No. 228,
pp. 495-499. Lit. 19.

Not only field biologists but also biology teachers sometimes run into problems with identifying a specie, encountered either outdoors or in school. Students want to know what an organism is, what its name is, etc. For this the teacher should know how to proceed in identification, how to use a Key for identification, etc. It is possible to contact an

expert, but much better to begin by comparing the natural object with those pictured in various atlases and keys. Scientific names are given to plants and animals on the basis of internationally accepted rules, which denote genera and specie and have been summed up for computer storage and retrieval in a list called Botanical and Bacteriological Codes of Nomenclature. When names are given in Latin it should be possible to understand their meaning. The author cites various examples - for instance Polytrichum (moss) means "with many hairs", while Atricum means without hairs, Oligotrichum means having a few hairs, etc. Thus Latin names of plants or animals should always be explained. Some groups of organisms are very difficult to precisely identify and therefore the author recommends starting with those whose identification is fairly simple.

didactics of biology - biology instruction - teaching methods - work with books - identification keys - excursions - terminology - Great Britain. 147309.

182. KLUG, W.:

Erfahrungen und Anregungen zum Bestimmen von Pflanzensippen in Klasse 11 (Experiences and suggestions for determining plant species in the 11th class)
Biologie in der Schule, 32, 1983, No. 5, pp. 194-199.

The identification of plants according to the normally used Key may be quite difficult. It is important that each pupil learns how to proceed and is acquainted with each step in the identification process. The author cites a number of examples with the identification of plants and their phylogeny.

didactics of biology - biology instruction - teaching methods - work with literature - Identification key - excursion - GDR. 147309.

183. SNOW, K.R.:

Identification of the Genera of British Mosquito

Larvae

The School Science Teacher Review, 65, 1983, No. 230, pp. 74-80. Lit. 3, 4 figs., 1 tab.

Mosquitos are an important specie of fauna. In warmer climates their incidence is linked to malaria. The author here acquaints readers with the morphology, development and ecology of mosquitos and provides a Key for their identification in Britain, which is intended for college students, as well as secondary school students. But the use of the Key assumes a knowledge of morphology. He also describes in detail methods for the collection and identification of larvae of several mosquito genera.

didactics of biology - biology instruction - zoology - insects - larvae - Identification key - Great Britain. 147309.

9.7. Method of observation

184. BARRETT, D.R.B.:

Observing Cleavage in Rhadbitis ssp.

The School Science Review, 64, 1983, No. 228, pp.483-485.
3 figs., lit. 25.

The author describes the collection, breeding and use of roundworms found in the soil to observe the cleavage of their larvae. Usually this process is explained only verbally or a drawing of morula, blastula and gastrula is provided. But it is quite easy to demonstrate the cleavage process directly on a fresh specimen or the pupils can observe cleavage in the laboratory for themselves. The life cycle of this roundworm has four stages; the third stage of the larva lives in the body of its host which is the earthworm, in two forms - either encysted in the body wall of the earthworm or freely in the earthworm's nephridium. The larva seem to eat bacteria excreted into the nephridium with body liquids. When the earthworm dies, the larva of the roundworm gains its nutrition from the decomposing body of the earthworm. When this source of nutrition has also been exhausted, the larvae move to the surrounding soil where they seek a new earthworm and through the nephridium orifice they enter its body and thus complete their life cycle. The males of the roundworm can easily be distinguished from females by the shape of the end of their bodies and by their tasticles, while the females have an uterus and ovum. In the uterus larvae in various stages of cleavage can be found. Only females should be used for the experiments; under a microscope it is easy to see these various stages.

didactics of biology - biology instruction - zoology -
parasites - worms - microscopic specimens - obser-
vations - Great Britain. 147309.

185. GLÄSER, H.:

Begonien - Nutzpflanzen des Biologielehrers

(Begonias - very useful plants for biology teachers)
Biologie in der Schule, 32, 1983, No. 5, pp. 193-194.

Begonias, which are popular decorative plants found both outdoors and indoors, are also very useful for biology teachers seeking suitable plant material for biology instruction. Their cultivation requirements are minimal. The author describes some of their uses: in the 5th class - for the topic "Leaf components" and "Non-sexual reproduction"; in the 6th class - "The reproduction of blooming plants"; in the 9th class - for a demonstration of plasmolysis and deplasmolysis.

didactics of biology - biology instruction - botany -
morphology - physiology - instruction method -
observation - experiment - GDR. 147309.

186. GRÜNIGER, W.:

Untersuchungen mit Flechten als Bioindikatoren der Luftverschmutzung (A study of lichens as bio-indicators of air pollution)

Der Biologieunterricht, 19, 1983, No. 2, pp.48-90.
Lit. 70, 9 tabs., 8 figs., 4 worksheets.

Lichens can serve as bio-indicators of air pollution; in clean air they grow on fences and the trunks of trees, in an atmosphere polluted by SO₂ they do not grow at all. At the Pedagogical Faculty

at Reutlingen a study was carried out, together with students from secondary schools in the vicinity, of lichens found in the region and through them also of air pollution. Lichens assimilate nitrogen from the atmosphere in the form of protein while sulphur compounds and heavy metals are found in the unicellular plant body unchanged. Their quantity can be measured or assessed on the basis of changes in colour, the number of soredia, the speed of photosynthesis, enzyme activity, the incidence of necrotic white spots on the lichen and by the disappearance of lichens from epiphytic communities. There are also other bio-indicators of pollution such as Petunias, Crimson clover (for CO_2), tulips (for FH), the tobacco plant (O_3), etc. These chemicals are stressors because they hinder the growth of these plants. Bioindicators in some cases make it possible to measure the degree of pollution - these are called monitoring plants; plants that can be used for tests are called test organisms. The parameters on the basis of which bioindicators indicate changes are visual (optical indicators), changes in chemical composition (chemical indicators), and changes in physiological characteristics (physiological and biochemical indicators). The author discusses lichens at length, and which specific species are sensitive to changes in the environment. He also describes a model on the basis of which maps of lichens growths can be made. He then suggests a project, to which biology devoted 6 teaching lessons and another 6 lessons are devoted from the geography course. The project yielded a map of air pollution in the vicinity of the town.

didactics of biology - biology instruction - botany -
air pollution - environmental control - bioindicators -
lichen - observations - interdisciplinary relations -
FRG. 147309.

187. HESSE, M.:

Artenkenntnis bei Studienanfängern (Knowledge of
species by students at the beginning of their study)
Der Biologie Unterricht, 19, 1983, No. 4, pp. 94-100.
7 tabs.

The author recommends that in the course of biology studies in secondary schools greater attention is devoted to a study of various species. On the basis of a questionnaire administered to students of teacher training (in their second year of study), which aimed at determining their knowledge of species, genera and families of plants, as well as plant morphology, he comes to the conclusion that this knowledge is insufficient. He also discusses problems of collecting plant material, making use of plant material in botany lessons, the creation of herbariums, the organization of excursions and the collection of medicinal plants.

didactics of biology - biology instruction - botany -
systematics - herbariums - excursions - teacher training - FRG. 147309.

188. KIRCHSHOFER, R.:

Beobachtungsmöglichkeiten zum Sozialverhalten von Tierprimaten im Zoo (Opportunities for the observation of the social behaviour of primates in zoological gardens)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 4, pp. 115-122, Lit. 34, 1 worksheet, 1 instruction sheet.

The author suggests making use of the zoological gardens found in the Federal Republic for observations of the social behaviour of primates. In some zoos special scientific pavillions have been built for primates. Pupils from the upper classes of secondary school should be accompanied by members of the staff of the zoo, as well as by their teachers. The behaviour of individual animals, their social groups and relations among individuals can all be the subject of observation. Preparations should be carried out in advance, before the visit to the zoo, so that pupils know what to look for and learn to observe from the point of view of scientific ethology.

didactics of biology - biology instruction - zoology - ethology - observations - zoological garden - FRG.
147309.

189. NICHOLAS, A.R.:

Pigeons in Town

Teaching Science, 1, 1983, No. 3, pp. 77-78.

In town we often encounter wildly living pigeons. The author describes opportunities for their observations from the point of view of ethology, where the relation between the individual bird and the flock,

their copulation, building of nests, care of young, etc. can all be observed. The author also suggests genetic observations where the pigeons' different colours are studied.

didactics of biology - biology instruction - zoology - genetics - ethology - birds - observations - Great Britain. 147309.

190. PAZOUREK, J.:

Pozorování živých struktur - 1 (Observation of living structures - 1)

Věda a technika mládeži, 37, 1983, No. 15, p. 456.

The author describes the leaf as a plant organ, its anatomy and relation to photosynthesis. The leaf contributes to the plant's transpiration; 1 dm² of a leaf's surface evaporates an average of 1500 to 2000 mg of water every hour, but with closed stomata only 10 % of this quantity in heliotropic and 20 % of this quantity in umbral plants. The author describes the observation of living structures and the measurement of length under a microscope, as well as how to calculate the size for instance of stomata in terms of area.

biology - botany - microscopy observations - plant structure - stomata - Czechoslovakia. 147309.

191. PAZOUREK, J.:

Pozorování živých struktur - 2 (Observations of living structures - 2)

Věda a technika mládeži, 37, 1983, No.16, p. 48.
1 fig.

Three-dimensional organs and their measurement are very important in the study of plant physiology.

The author acquaints readers with various methods of these measurements, for instance the stereological method where a cross-section cut is covered with a network of points and these are counted in actual relation to various organ structures. These structures change according to the environment in which the plant lives. Stereological methods make it possible to study the inner surface of leaves, which in some plants is much larger than their external surface. For instance a Catalpa tree 21 years old has an inner surface of leaves of 5100 m^2 , while the external surface of its leaves is only 390 m^2 . The author stresses the necessity of using such and other scientific methods in biology.

biology - botany - plant organs - leaf - structure -
microscopy - scientific method - Czechoslovakia.
147309.

192. PIES - SCHULTZ - HOFEN:

Beobachtungen einiger ausgewählter Verhaltensweisen von Huftieren (Observations of some selected behaviour patterns in Ungulates)

Der Biologieunterricht, 19, 1983, No. 1, pp. 4-49.

Lit. 63. 9 worksheets, 4 models for transparencies, 1 diagram, 1 fig.

The author recommends an excursion to a zoo where it is possible to study the behaviour of some ungulates. First general problems of observing animal behaviour are discussed and the dangers of anthropomorphization. He suggests studying territoriality and combat behaviour during which the animals may be wounded, or even killed (Mountain goat) or when the struggle is only pretended. The author recommends dealing with

ethological problems in three units with 3 teaching lessons each. First the pupils become acquainted with the systematic classification of Ungulates and with their territory type (on the basis of the example of the Indian rhinoceros); zoos are secondary environments and the territorial behaviour of animals in zoos should be studied separately. In the final section different types of combat among Ungulates and how they differ are described.

didactics of biology - biology instruction - zoology -
ethology - zoological garden - observations - behaviour -
FRG. 147309.

193. STARKE, D.:

Zum Einsatz von pflanzlichen Naturobjekten in den Klassen 5 und 6. (On the use of natural plant material in the 5th and 6th classes)

Biologie in der Schule, 32, 1983, No. 5, pp. 189-192.
2 tabs.

The biology teaching syllabus calls for the use of natural materials and in botany this means plants. Practical exercises offer opportunities for differentiated teaching and thus for stimulating gifted pupils and providing opportunities for the activation of less successful pupils. The author also describes how she obtains suitable plant material in all seasons.

didactics of biology - biology instruction - botany -
observations - experiments - plant material - GDR.
147309.

194. STRANGE, A.:

Put Some Color in Your Microscope

The Science Teacher, 50, 1983, No. 1, pp. 21-25.

Lit. 2, 7 figs.

If structures are to be distinguished and details observed under a microscope then sophisticated staining of specimens is required or the use of a polarizing microscope, etc. Here the author acquaints readers with an old, but highly effective method of observing microscopy specimens under Rheinberg's differential illumination. This method was used for the first time in 1883 by J. Hardy of Great Britain and 30 years later by Julius Rheinberg. During these observations color slides are used, as well as filters; also colored cellophane or color film can be used. Clear color contrasts are achieved, especially when different filters are combined. Even three-dimensional images can be obtained in this manner.

didactics of biology - microscopy specimens - observations - coloring - USA. 147309.

195. TOMLEY, D.:

Sun and Shade Leaves: Some Field Investigations

Journal of Biological Education, 17, 1983, No. 1, pp. 11-12.

The author describes the light regimen of various plants and the influence of this factor upon photosynthesis in plants. Some seeds will not germinate without light, some plants will not bloom unless they have a regular light regimen and also the plant's shedding of leaves is influenced by this factor. In fact there is no stage in plant development which is

not influenced by the amount of light the plant receives. The author acquaints readers with an index of light reflected from leaves (leaf area index - LAI). Grasses have a LAI of 25 %, cereals 20 %, a pine forest 15 %, pineapples 10 %. Leaves in the shade are able to utilize even a low intensity of light, while heliotropic plants are able to withstand a high intensity of light. The author describes a number of plants which are suitable for this type of study, where the stress is on anatomical aspects, such as thickness of leaves, the number of parenchyma layers, cuticle thickness, the number of trichomes on the surface of the leaf and the density of its chlorophyll. The required instruments for this type of study are listed.

didactics of biology - biology instruction - botany - physiology - plant organs - anatomy - leaves - Great Britain. 147309.

196. VOESACK, L. - SCHREGER, H.:

Die Rote Küchenzwiebel - ein geeignetes Naturobjekt für mikroskopische Beobachtungen (Onions as a suitable object for microscopy observations)

Biologie in der Schule, 32, 1983, No. 7-8, pp.298-299.

In the topic "Cells" in the 7th class pupils should be able to recognize cell organelles and to realize that all organisms are composed of cells. Experience has indicated that the variety of onion *Allium cepa* L is very good for this purpose. Various shapes of cells can be shown, as well as their organelles, without staining the nucleus; also cells with and without chloroplasts can be demonstrated.

didactics of biology - biology instruction - botany -
cells - observations - microscopy - organelles - GDR.
147309.

9.8. Experimental method

197. ALEXIANDRE, B.:

La respiration avant Magendie et Claude Bernard
(Respiration before Magendie and Claude Bernard)
Biologie - Géologie, 70, 1983, No. 1, pp. 135-153.

It was only in the 18th century that science made important discoveries concerning respiration, which have created the basis of our present knowledge of this important physiological phenomenon. The Frenchman Lavoisier and the Italian Spallanzani are the two most important scientists the author writes about in this context. He describes their experiments and quotes their work from 1789 about the respiration of animals and other writings by Lavoisier from 1801. A special section is devoted to Spallanzani, who lived in Geneva and who also carried out a number of experiments with respiration. The author thus provides a comprehensive view of the knowledge existing before the pioneering work of the two scientists mentioned in the title.

didactics of biology - biology instruction - botany -
zoology - physiology - respiration - history of
science - France. 147309.

198. BARELT, D.:

Body Size and Temperature: An Extended Approach
Journal of Biological Education, 17, 1983, No. 1,
pp. 7-8.

The author describes possibilities for extending instruction on the basis of the Nuffield project with texts concerning the size of a body and the temperature losses it incurs. The pupils can follow this problem on the basis of experiments: Three vessels of various sizes are filled with water of the same temperature - 100 °C and then measure their cooling in five minute intervals during 30 minutes. Then the surface of each vessel is calculated and temperature losses are shown in graphic form. On the basis of mathematical and physics calculations conclusions can be drawn on the relation between temperature loss and the surface area of the vessels.

didactics of biology - biology instruction - physiology - temperature - teaching methods - experiments - Great Britain. 147309.

199. BECHLER, C.:

A Model Ecosystem
Journal of Biological Education, 17, 1983, No. 3,
pp. 184-185. Lit. 2.

The author suggests making a model ecosystem out of plastic bags used for soft drinks, with a 1.5 dm³ and 2 dm³ volume. These bags are filled with pond or rain water into which a suitable sample of organisms has been placed and the bag is then put in a suitably lighted and heated place for photosynthesis to take place. Variations of the model can use colourless, green or brown coloured bags. The green colour does

not support the growth of green plants and slows down the development of the ecosystem. The author also cites a number of plants and animals which are suitable for use in the model.

didactics of biology - biology instruction - ecology - model - ecosystem - plants - photosynthesis - animals - Great Britain. 147309.

200. BOJUNGA, W.:

Pflanzenwachstum auf Waldboden und im Düngenversuch
(The growth of plants in forest soil and in an experiment with fertilization)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 9, pp. 297-298.

In a simple school experiment, proof is given that humus found in the forest contains all necessary nutrient salts required for the growth of plants. Next it is shown that these salts develop in the humus due to the activities of soil microorganisms. In conclusion the project stresses that soil microorganisms are very important for the fertility of the soil.

didactics of biology - biology instruction - plant + growth - minerals - humus - soil - microorganisms - experiment - FRG. 147309.

201. BROWN, C.R.:

Banana polyphenol oxidase

The School Science Review, 64, 1983, No. 229, p. 690-695.
Lit. 6, 5 figs.

Polyphenol oxidase is a catalyst in the oxidation of a large number of phenolytic compounds; the subsequent non-enzymatic reactions lead to the creation

of melanine pigments which appear at the site of damage on fruit or vegetables in the form of brown spots. Potato polyphenol oxidase can be made use of in school experiments; also bananas can be used to obtain a highly active polyphenol oxidase. Students study these reactions with the aid of a colourmeter, the exhaustion of the available oxygen in the course of the reaction and other characteristics of the enzyme. These experiments can easily be done in school laboratories.

didactics of biology - biology - interdisciplinary relations - chemistry - experiments - enzymes - Great Britain. 147309.

202. BURGESS, J.A.:

An Improved Potometer

The School Science Review, 64, 1983, No. 229. pp. 699-701, 3 figs.

In school experiments two types of potometers are used - one based on weighing and the other based on a movable air bubble. The author describes a potometer which combines the characteristics of both these instruments and thus makes it possible to measure water loss and at the same time a rise in the water level. The author cites details of the instrument's construction, its advantages and possible errors it can make.

didactics of biology - biology instruction - instruction method - experiment - instrument - Great Britain - 147309.

203. McBURNEY, T. - COSTIGAN, P.A.:

A Recording Plant Transpiration Balance

Journal of Biological Education, 17, 1983, No. 3,
pp. 247-256. Lit. 7, 3 figs., 1 tab.

The author describes a special apparatus which makes it possible to automatically record the transpiration of water by a plant. It is thus very suitable for a study of factors which influence the movement of water through a plant. The apparatus can also partially be used for a demonstration of the importance and function of stomata or plant leaves. Transpiration and its fluctuations are recorded and thus the level of transpiration can be monitored constantly and data on the level of losses in the weight of the plant in a pot can be obtained. All this is based on a special electrical device for determining a mechanical balance of water in the plant. The device is suitable for school biology laboratories and its construction represents only small costs. The author describes experiments with transpiration balance and the discussions which accompanied these experiments.

didactics of biology - biology - physiology + plant -
transpiration - teaching methods - experiment - device
+ school laboratory - Great Britain - 147309.

204. BURROWS, J.:

An Experiment to Illustrate the Significance of Aerobic Respiration in Yeast

The School Science Review, 64, 1983, No. 229, pp.698-699.
Lit. 2.

The author describes experiments with aerobic and anaerobic respiration in yeast. Some of the experiments

are based on the utilization of a respiration deficit of yeast mutants, but the best results are obtained with the aerobic respiration of yeast.

didactics of biology - biology instruction - micro-organisms - yeast - physiology - experiments - aerobic respiration - Great Britain. 147309.

205. CARTER, J.B. - SMITH, A.D. - LEA, D.J.:

A simple vertical slab gel electrophoresis apparatus
Journal of Biological Education, 17, 1983, No. 1,
pp. 5-6. Lit. 4, 2 figs.

Commercially sold eletrophoresis apparatuses are very expensive. The author describes the making of a simple vertical slab gel apparatus which can be used for electrophoresis in school laboratories and which serves just as well as those commercially sold, but is much cheaper. He provides a drawing of the apparatus and describes its use by pupils.

didactics of biology - biology instruction - laboratory work - electrophoresis - experiment - Great Britain. 147309.

206. CHISTOVA, K.N.:

Nekotoriye rekomendatsii k provedeniyu opitov na shkolnikh uchabno-opitnikh uchastkakh (Some recommendations for carrying out experiments on school experimental plots of land)

Biologiya v shkole, 57, 1983, No. 3, pp. 63-65.

The author stresses the need to select experiments which are interesting, which pupils can easily comprehend and carry out, which are in accord with the teaching syllabus and which have a bearing on aggr-

cultural production. She then provides specific recommendations concerning these experiments which at the same time contain instructions on how to proceed in individual stages. Also a bibliography for teachers is provided.

didactics of biology - biology instruction - teaching methods - experiments - school plot of land - USSR. 147309.

207. DOWNING, E.J. - MEDDINS, R.J.:

A Stroboscopic Technique for Measuring Daphnia Heart-beat Rate

Journal of Biological Education, 17, 1983, No. 3, pp. 257-259.

The author describes experiments where students measure the heart-beat rate of Daphnia as a function of the temperature of their water environment. The temperature of the water can be changed and measured with suitable techniques, while the pulse rate is measured on the basis of stroboscopic techniques. The author describes a simple apparatus for this purpose, the course of the whole experiment and its assessment.

didactics of biology - biology instruction - zoology - physiology + animals - heart-beat - measurement - experiments - Great Britain. 147309.

208. DUBOWSKY, N. - HARTMAN, E.M.:

The Origin of Life. A Demonstration of Redi's Experiment

The American Biology Teacher, 45, 1983, No. 8, pp. 431-432. 1 photo.

The author describes the classical experiment by Francis Redi concerning the spontaneous hatching of

flies and insects from decomposing organic substances (spontaneous generation or abiogenesis). Aristoteles also held this opinion. The author recommends the use of the *Drosophila* fruit fly for this type of experiment. 3 bottles are used, one is left open, the second is covered by gauze and the third is tightly shut. In the bottles commercially available sterile cultivating media are placed for the *Drosophila* larvae. The experiment is simple and yields a large amount of information.

didactics of biology - biology instruction - zoology - teaching methods - experiments - origin of life - spontaneous generation - USA. 147309.

209. DUSKA-WINDELBAND, A. - ZOOLAUER, K.:

Zur Einbeziehung neuer wissenschaftlicher Erkenntnisse und Arbeitsmethoden in den Biologieunterricht - dargestellt am Beispiel "Mitose" (On the utilization of new scientific knowledge and new work methods in biology instruction - demonstrated on the example of the topic "Mitosis")

Biologie in der Schule, 32, 1983, No. 4, pp. 153-156. 3 figs.

Theoretical parts of the teaching syllabus should always be combined with examples from biological research and practical biology. One such possibility is offered by theoretical knowledge concerning plant tissue cultivated in various media. The propagation of plants in vitro is frequently used in gardening and agriculture as one of the methods of vegetative reproduction in aseptic conditions. This propagation is carried out with isolated parts of a plant. This subject-matter can be used in the 10th class when

teaching the topic "mitosis". The authors especially stress the use of problem teaching and demonstration experiments.

didactics of biology - biology instruction - botany - vegetative propagation - plants - teaching methods - demonstration experiment - GDR. 147309.

210. EGERT, T. - MEYER, C. - WESSEL, A.:

Messungen, Untersuchungen und Versuchen zum Thema "Sauer Regen" (Measurements, research and experiments on the topic "acid rain")

Der Biologie Unterricht, 19, 1983, No. 4, pp. 103-113.
Lit. 6, 4 figs.

Acid rain has become a world-wide problem, large sections of forest are dying, the soil and both surface and underground waters are polluted. The authors provide information on a project whose findings showed that 13 different soil samples had an acidity over optimum standards and that over 50 % of all rain water samples had a pH value between 3.8 and 4.4. Acid rain which flows over rooftops is somewhat neutralized. Acid rain slows down germination, increases the effect of bacteria and mildew. The authors describe a number of various experiments on acid rain and show how the outcome of the experiments can be combined with rain data to arrive at pollution figures.

didactics of biology - biology instruction - environmental conservation - acid rain - experiments - FRG. 147309.

211. EMMERICH, W.:

Elektroakustische Darstellung von Herzschlag und
Armatillerienpunkt im Biologieunterricht

(Electro-acoustic depiction of heart beat and pulse
rate in biology instruction)

Der mathematische und naturwissenschaftliche Unter-
richt, 36, 1983, No. 7, pp. 424-426. 1 fig.

The author describes a simple preamplifier which
can be used to demonstrate the sounds of the human body
as captured by a microphone in biology lessons. The
authors concentrate on heart beat and the pulse in
the arteries of the forearm. This demonstration is re-
commended for the 10th class. The sounds can be liste-
ned to by the whole class at one time. In conclusion
the author deals in detail with the technical aspects
of the experiment.

didactics of biology - biology instruction - human
biology - physiology - acoustics - experiment - FRG.
147309.

212. FIDO, H.:

Chi-square tests on a microcomputer

The School Science Review, 65, 1983, No. 231, pp. 290-294.

Students can gather data in the course of various
experiments which can then be statistically processed
with the aid of a microcomputer on which the chi-square
test can be calculated. The use of this test makes it
much easier to draw conclusions concerning the signi-
ficance of findings. The article contains two different
computer programs for the chi-square test, one for a
simple standard analysis and the second which includes
probability tables. Both programs have been verified

for microcomputer use and can be used in students' independent work. The standard chi-square test is especially useful in genetics.

didactics of biology - biology instruction - teaching program - microcomputer - software - Great Britain. 147309.

213. GODISCH, T.:

Home is Where the Formaldehyd Is

The Science Teacher, 50, 1983, No. 9, p. 26,
2 photos.

The author describes two experiments whose aim it is to acquaint pupils with the chemicals which are regularly used for the preservation of natural objects (liquid mounted specimens are put into formaldehyd) and which can pollute the school environment and create a health hazard if they are not used and stored with care and according to safety regulations.

didactics of biology - biology instruction - teaching methods - experiments - chemicals - hygiene and safety of teaching - USA. 147309.

214. GODSELL, P.M.:

Starch Gel Electrophoresis

The School Science Review, 64, 1983, No. 228, pp. 488-495.

Methods which make it possible to study the properties of proteins are widely used in schools. But some aspects of protein behaviour have not been studied sufficiently. The article devotes attention to a study of proteins with the help of electrophoresis. The techniques described are simple and productive and they require instruments which can easily be

assembled in school. The author describes experiments to show that blood plasma and blood serum are protein mixtures, for the separation of various proteins found in an chicken egg and for making comparison between proteins found in milk and in pure casein, etc.

didactics of biology - biology instruction - general biology - electrophoresis- proteins - experiments - Great Britain. 147309.

215. GORSKA, A.:

Materialy do obserwacji ówieczeń i doświadczeń w klasie IV i V. (Materials suitable for observations, exercises and experiments in the 4th and 5th class) *Biologia w szkole*, 36, 1983, No. 1, pp. 35-36.

The author cites interesting material for observations, exercises and experiments for the 4th and 5th class. A survey cites the class, section of teaching syllabus and suitable original natural objects needed and the opportunity for their use.

didactics of biology - biology instruction - 4th and 5th classes - basic school- observations - experiments - Poland. 147309.

216. GREBEL, D.:

Ein Kurzzeitversuch zum Eisenkreislauf eutropher Seen
(Ein Beitrag zur experimentellen Behandlung der
fachübergreifenden Gewässerkunde im Biologieunterricht)
(A short-term experiment on the circulation of iron
in eutrophic lakes. A contribution to an experimental
concept of interdisciplinary limno-biology in biology
instruction)

Praxis der Naturwissenschaften - Biologie, 22, 1983,
No. 1, pp. 19-21. Lit. 2, 1 transparency.

The circulation of iron in eutrophic lakes
depends upon the reversible transformation of dis-
solved Fe^{II} salts which are essential for algae,
into non-dissolvable ferric salts (Fe^{III}). The author
recommends a short-term experiment which makes it
possible in a school laboratory to demonstrate within
a few minutes the process of reversible oxidation
and/or the reduction of iron ions and changes in the
size of iron ion voltage in a_{water} solution. The cir-
culation of iron in eutrophic lakes is based on the
oxidation and reduction of Fe ions.

didactics of biology - biology instruction - limno-
biology - experiments - iron - circulation - eutrophic
lakes - FRG. 147309.

217. GREENLAND, J.E.:

To study the effect of hydrogen ion concentration
upon the amoebic movement of the soil ciliate Colpoda

Journal of Biological Education, 17, 1983, No. 2, p. 100.

The author informs readers about a project under-
taken by a Primary School in Bristol which recieved
the Prince Philip Prize from the London Zoological

Society. The project concerned the encystment of soil ciliata Colopoda, Blepharisma and Dileptus. The experiment concerned the influence of acids and an acid environment upon the ciliata and their encystment. Colopoda in the feeding stage die when pH rises to 4. Encystment is also influenced by pH values. Cysts in the rest stage are able to withstand pH values which are between 10 and 100 times greater than the concentration of pH ions, which proved lethal during the feeding stage.

didactics of biology - biology instruction - zoology - physiology - protozoa - experiments - Great Britain - 147309.

218. HEGEMAN, M.:

Versuch zum Nachweis der Eiweisverdauung

(An experiment to prove the digestion of proteins)

Biologie in der Schule, 32, 1983, No. 2-3, pp.100-101.

1 fig.

Every amateur photographer knows that the beginning of an exposed film should be cut off and thrown away. But these snips of film can be used in an experiment in which the effect of proteasis is shown. The emulsion layer of the film is composed among others of gelatine, which is a protein. To provide proof that it is really a protein an experiment can be carried out with the white, unexposed parts of the film. After putting the piece of film into a solution containing concentrated nitric acid, a xanthoprotein reaction takes place. The gelatine can then be digested. The film should be soaked for 30 minutes in water before the experiment. When the gelatine layer has become slightly swollen, some enzymes (a 0.1 % solution

of trypsin in a 0.4 % solution^{of} hydrogensodium carbonate) are added, but we must be careful that no drops of water remain on the film. The strip of film is then kept in a chamber with a high humidity factor, which is placed into a thermostat heated to 35 °C for 20 minutes. During this time the gelatine will have begun to be digested. The film is then washed under running water. Where the enzyme has made an impact, white spots appear which are transparent. For a control experiment we can use either drops of water or a boiled (and hence ineffective) enzyme solution.

didactics of biology, biology instruction - physiology - digestion - protein - enzym - experiment - GDR.

147309.

219. HESSE, M.:

Sprossknollen mehrjähriger Sonnenblumen (The stem tubers of perennial Sunflowers)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 5, pp. 158-164. Lit. 16. 11 figs.

The stem tubers of a garden variety of perennial Sunflowers called *Helianthus tuberosus* or the Jerusalem artichoke produce good shoots in a water culture and have a high regeneration ability. They are thus valuable as a source of plant material for biology teaching. The author discusses the biology of this plant in detail. The tubers, which are edible, have a polarised structure and are interesting from a botanical point of view.

didactics of biology - biology instruction - botany - observation - experiment - plant physiology - FRG.

147309.

220. HESSE, M.:

Schüler stellen Zuckersirup her (Pupils make sugar sirup)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 12, pp. 415-416. Lit. 4, 1 fig., 1 worksheet.

The article explains the economic and technical aspects of sugar production where the sugar sirup is an intermediate product. This subject-matter is suitable for the 5th or 6th class of basic school and includes a number of simple experiments which are described in detail. Pupils observe the oversaturated sirup which then produces sugar crystals. The initial raw material is sugar beet. Also figures on world sugar production are cited and the amounts made from cane and beets. The article provides factual information for both pupils and teachers.

didactics of biology - biology instruction - botany -
photosynthesis - sugar - experiments - sugar production -
FRG. 147309.

221. HUNT, J.D.:

Feeding Response of a Sea Anemone
The American Biology Teacher, 45, 1983, No. 6,
pp. 353-354. Lit. 8, figs. 2.

Sea anemones are part of the fauna communities found on seashores and river deltas, they live in muddy, sandy or rocky environments, as well as on coral reefs. Some of them are buried in the sand, others cling to cliffs. The author describes observations and experiments with Sea anemones living on the shores of the Gulf of Mexico, specifically their feeding behaviour and response. To study them, students offer them strips of filtration paper dipped

into solutions of various substances and their reaction is studied. The findings of the observations are recorded and analysed. The feeding of the Sea anemones can be directly observed.

didactics of biology - biology instruction - zoology - physiology - ethology - Coelenterata - sea fauna - USA. 147309.

222. JOBUSCH, G.:

Attrapenversuch mit Tubifex (Experiments with tubifex and dummies)

Praxis der Naturwissenschaft - Biologie, 32, 1983, No. 1, pp. 21-28. 5 figs., 2 models for transparencies.

Tubifex are found in large numbers in the mud at the bottom of freshwater ponds or lakes where they live in large or small colonies. The forming of colonies is the outcome of their instinctive behaviour where the key to identifying the members of a specific specie is a type of excitation, called a key reflex or key stimulus. Experiments in which dummies are used can prove the existence of key excitation. The author describes how to breed the Tubifex and how to organize their observation and experiments with them. They can serve as an introduction to invertebrate ethology.

didactics of biology - biology instruction - zoology - invertebrates - observations - experiments - ethology - FRG. 147309.

223. JUSKIEWICZ, B.:

Rola prac eksperymentalnych w nauczaniu biologii
(The role of experimental work in biology instruction)
Biologia w szkole, 36, 1987, No. 12, pp. 111-113.
Lit. 10, 3 figs.

The author explains the importance of experiments in biology instruction and comes to the conclusion that the educationally positive effects of doing experiments in school far outweigh the difficulties with their organization. The author describes experiments with the reactions of the Earthworm and the growth and fertilization of the kidney bean. In conclusion the article describes various organizational forms of activities with pupils which are connected with nature conservation.

didactics of biology - biology instruction - teaching method - experiment - Poland. 147309.

224. Kaspar Hauser - Experimente. Ein Unterrichtsmodell für die Sekundarstufe (Kaspar Hauser experiments - a teaching model for the upper classes of secondary school)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 12, pp. 360-374. Lit. 19, 6 drawings for transparency, 4 worksheets.

Experiments which are designated as Kaspar Hauser are designed to study genetically determined behaviour, as well as behaviour acquired during the individual's lifetime. Under laboratory conditions, animals are bred in isolation, so the animal cannot learn from adult animals. The teaching model described requires 4 teaching lessons. During the first two-hour

period an analysis of the animal's behaviour is carried out, especially its con/^{genital} behaviour at the lower and higher integration level and a discussion on learning individual behavioural techniques and behaviour elements determined by isolation in man and apes. Scientific ethology distinguished hereditary and non-hereditary behaviour. In insects and spiders hereditary behaviour has the form of congenital instincts (closed behavioural programs). Hereditary signs are usually rigid in pattern, all the individuals of the species behave in an identical manner under the same conditions, the course of the behavioural pattern cannot (almost) be influenced, even during a period when the relevant organ has not yet come to maturity (for instance the action of the oil glands with which ducks lubricate their feathers); this type of behaviour often includes historical components which are no longer rational and can best be studied by isolating individuals from birth. In humans such experiments are out of the question for ethical reasons, but nevertheless such experiments have, historically, occurred. didactics of biology - biology instruction - zoology - ethology - isolation - hereditary behaviour - FRG. 147309.

225. KOVÁČOVÁ, V. - KOŠÍROVÁ-ČIEPOVÁ, A.:

Kvasinky ako pokusný materiál na stredných školách

(Yeast as material for experiments in secondary schools)
Přírodní vědy ve škole, 34, 1982-1983, No. 5, pp.166-170.
Lit. 4, 6 figs.

The article describes experiments which have been practically verified, where yeast was used in biology exercises to study reproduction and the influence of the environment on the internal structure of cells. The assignments given to pupils during these exercises are conceived in such a way that they can be done even in those schools whose equipment and facilities available in laboratories are modest. The material used are ordinary baker's yeast which is commercially available, and laboratory strains of *Saccharomyces*, together with samples of the genus *Schizosaccharomyces*; this is mostly material which can easily be acquired all year around. The authors describe the biology of yeast, sexual, as well as non-sexual reproduction, the creation of zygotes and the influence of ultraviolet light on the lifespan of the yeast cells. During the experiments also the creation of morphological changes are studied, the creation of modification and mutations and the presence of volutin, glycogen and fats in the yeast cells.

didactics of biology - biology instruction - botany -
teaching method - experiment - yeast - Czechoslovakia.
147309.

226. LEGALL, W.D. - RÜHLE, V.:

Nachweis von Vitamin C (Proof of vitamin C)

Biologie in der Schule, 32, 1983, No. 11, p. 441.

The authors here continue in the subject-matter of an article published in issue No. 2-3, in 1983.

They recommend proving vitamin C with the aid of Fenling's solution, an ammonia solution of silver nitrate, cupric sulphate and silver nitrate. The advantage of these reagents is that they do not react with glucosis. Vitamin C also bleaches a potassium permanganate solution.

didactics of biology - biology instruction - vitamins - teaching method - experiment - GDR. 147309.

227. LONGENECKER, N.E. - ADAMS, J.:

An Inexpensive Rotarod for Behavioural Sciences

The American Biology Teacher, 45, 1983, No. 2, pp. 96-97, 2 figs., 1 tab., lit. 1.

The author acquaints readers with an inexpensive device for laboratory studies of animal behaviour. He calls the device a rotarod, which makes it possible to study and measure motor coordination activities of mammals. The laboratory animal (a mouse or rat) is placed on the rotating rod. To maintain its balance the animal must run in an opposite direction than the direction in which the rod is turning. The structure of the rod is described and a number of experiments for which it can be used.

didactics of biology - physiology - animal ethology - mammals-teaching method - experiment - USA. 147309.

228. KLEE, I.:

Die Herkunft der Energie bei Lebewesen (The origin of energy in organisms)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 9, pp. 327-332. Lit. 9, 2 worksheets, 4 figs.

A school topic which deals with the origin of energy in organisms is based on subject-matter already previously taught, concerning food chains and networks and nutrients as the carriers of energy. The importance of photosynthesis is stressed for the accumulation of chemical energy in nutrients. On the basis of a simple experiment done by pupils it is possible to demonstrate how energy is accumulated in green plants. The course of the reaction studied is explained in detail. Food and energy chains, food pyramids and energy pyramids are shown on diagrams. The focus of attention is on the circulation of nutrients and energy in an open system. Three different experiments on this subject-matter are described in detail.

didactics of biology - biology instruction - physiology - nutrition - food chains - energy chains - experiments - FRG. 147309.

229. KLEE, J.:

Die Umsetzung von Energie bei Lebewesen (The transformation of energy by living organisms)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 9, pp. 323-326. 1 worksheet, lit. 10.

This teaching topic on energy transformations which take place in living organisms is intended for extending the subject-matter of nutrients as the biological carriers of energy. On the basis of simple

school experiments done by pupils concerning external respiration and cellular respiration it is possible to explain to pupils the complicated relations which exist between the consumption of nutrients and internal respiration and thus to show how organisms economize energy. This topic can also be extended by elements of health-care education: Cellular respiration in humans makes use of energy stored in food. In the transformation of energy and in energy metabolisms in an organism the consumption of nutrients, as well as internal and external respiration are all linked together. The author describes in detail how to proceed in class and also describes a model experiment where a cube of sugar is burnt with the aid of a catalyst (cigaret ash). A worksheet is used to record the number of exhalations and the pulse rate before and after loading an organism; this data is then measured and studied.

didactics of biology - biology instruction - physiology - energy and matter transformation - experiment - FRG. 147309.

230. KOROTKOV, G.P.:

O provedenii opitnikh rabot po fytopatologii v shkolnikh lesnichestvakh (On carrying out experiments in phytopathology in school forestry operations)

Biologiya v shkole, 57, 1983, No. 1, pp. 67-71.

2 tabs.

The author stressed the importance of the work done by pupils in school forestry operations, which not only contributes to pupils' learning but also can make a contribution to the national economy. Cooperation between schools and research institutions is highly

recommended. On the basis of the example of experiments in phytopathology, which concern various fungal diseases of trees, the author demonstrates how pupils can also make a practical contribution to keeping forests healthy and provides various information and instruction for this type of work.

didactics of biology - botany - phytopathology -
field work - forests - experiments - USSR. 147309.

231. LUDERITH, P.:

Einige Erfahrungen bei der Durchführung der Lehrplan-
experimente in Klasse 12 (Some experiences with
carrying out experiments cited in the teaching syllabus
for the 12th class)

Biologie in der Schule, 32, 1983, No. 7/8, pp. 300-301.

The author describes his own experiences with carrying out the experiments which are cited in the teaching syllabus for the 12th class. The experiments concern starch created in the lighted part of plants, the enzymatic effect of pancreatic juices on milk fats, alcohol fermentation, measuring the speed of enzymatic reactions in relation to temperature and the concentration of various substances.

didactics of biology - biology instruction - secondary
school - 12th class - physiology - plants - experiments,
GDR. 147309.

232. MANSFIELD, T.A. - PRICE, D.N.:

A water relations exercise on auxon-treated artichoke tuber tissue

The School Science Review, 64, 1983, No. 229, pp. 695-697.
2 graphs.

The authors describe an experiment which uses the tubers of the Jerusalem artichoke (*Helianthus tuberosum*), to demonstrate the increase in weight of slices of the tubers when treated with auxons (various concentrations of 2,4-dichlorophenolacetate acid), due to changed water relations.

didactics of biology - biology instruction - botanics - physiology - experiments - Great Britain. 147309.

233. MARTIN, F.L.:

Bryophyllum pinnatum: A Great Teaching Aid

The American Biology Teacher, 45, 1983, No. 2, pp.98-99.
5 figs.

Bryophyllum pinnatum is a member of the Crassulaceae or stonecrop family of succulent plants and is highly favourable for use in teaching botany. It originally comes from Madagascar and the tropics of the Old World. Its stem is thick and succulent and it has simple or triple leaves with saw edges and blooms which are green in colour. It grows to a height of about 70 cm. Both leaves and stem can easily be propagated in a vegetative manner. During its cultivation in school, pupils can determine optimum growth conditions, observe the growth of the young plants, roots and shoots, the tropism of the plant, its apical dominance and the scope of its influence, as well as its leaf type. This plant is thus very useful as a model for botany teaching.

didactics of biology - biology instruction - botany -
vegetative propagation - experiment - USA. 147309.

234. MAYER, G.:

Ein einfacher Versuch zum Nachweis von Vitamin C

(A simple experiment for the identification of vitamin C)

Biologie in der Schule, 32, 1983, No. 3, pp. 99-100.
1 fig.

Vitamin C is among those vitamins which are soluble in water. Its strong reduction characteristics can be explained on the basis of the configuration of -OH groups. In proving the presence of vitamin C, a piece of filtration paper is soaked in oxidized ferriochloride and dried. When a drop of the liquid which contains vitamin C is dropped on the paper, it is discoloured (a consequence of the reduction). To make the discoloured spots more clear, they can be exposed to red prussiate of potash. Various intensity of colour indicates various vitamin C content.

didactics of biology - biology instruction - teaching method - experiment - vitamins - GDR. 147309.

235. MERTENS, T.R..

Open-Ended Laboratory Investigations with Drosophila

The American Biology Teacher, 45, 1983, No. 5, pp. 264-266.
Lit. 9, 2 tabs.

The author recommends student assignments with Fruit flies of an unknown genotype. Students breed the Drosophila to obtain the F_1 and F_2 generations which are then assessed genetically, data is collected and hypotheses are formulated which explain the heredity pattern; gradually on the basis of phenotypes and the outcome of cross-breeding, this pattern is

developed. The data should be open-ended. Students can also start an experiment with a homozygotic line of *Drosophila* and then explain the genetics of the homozygotic line.

didactics of biology - biology instruction - genetics - experiment - insects - *Drosophila* - USA. 147309.

236. MEUERS, H.:

Photosynthese experimentell. Die Bedeutung des Faktors Licht für die Primärreaktion der Photosynthese. Anregungen für einen Unterricht in der Sekundarstufe II (Experimental photosynthesis - the significance of the light factor for a primary photosynthesis reaction. Recommendations for teaching in the upper classes of secondary school)
Der Biologie Unterricht, 19, 1983, No. 4, pp. 34-56.
Lit. 21, 15 figs.

The author here describes the history of our knowledge of photosynthesis. The teaching of this problem in biology represents a typical case of interdisciplinary relations. To understand photosynthesis the author recommends a number of experiments, such as the identification of starch in multicoloured leaves, the extraction of photosynthetic pigments, the separation of leaf pigments on the basis of paper chromatography, the separation of various layers of leaf pigments, determining the significance of leaf pigments for the adsorption of light, the action spectrum in photosynthesis and the fluorescence of chlorophyll.

didactics of biology - biology instruction - plant physiology - photosynthesis - teaching method - experiment - FRG. 147309.

237. OPENSHAW, P.:

What the Isopod Did Next

The School Science Review, 64, 1983, No. 228, pp.486-487.

The author describes a device which is made for breeding isopods. With his students he studies the behaviour of *Asellus aquaticus*, an isopod which lives in dark damp places, but also one of the species found in fresh water or on the sea shore. They are almost blind and with the aid of their very imperfect eyesight they are incapable of forming an image of their environment. This device for their study is in fact a labyrinth with several arms, which tests the animals' movement and memory. Experiments can be carried out with groups of 40 students.

didactics of biology - biology instruction - zoology - ethology - isopods - teaching methods - experiments - Great Britain. 147309.

238. PFEIL, H.:

Wohnungsbelüftung ist unbedingt notwendig (Properly airing the rooms we live in is absolutely necessary)
Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 7, pp. 252-253. Lit. 5, 2 figs.

The article deals with the problem of how rapidly the oxygen in the air of a room is consumed, especially when the room contains a larger number of people, as for instance classrooms, etc. The author uses mathematical calculations to clarify this problem, as well as two experiments, one of which uses a burning candle which consumes oxygen and produces carbon dioxide, which is heavier and therefore drops to the bottom of the vessel and can be measured.

didactics of biology - biology instruction - zoology -
human biology - hygiene - respiration - teaching method
- experiment - FRG. 147309.

239. PFEIL, H.:

Quantitative Bestimmung des Kohlendioxid - und
Sauerstoffgehaltes der Ausatemungsluft (The quantita-
tive determination of carbon dioxide and oxygen and
their incidence in exhaled air)
Naturwissenschaft im Unterricht - Biologie, 31, 1983,
No. 7, pp. 254-255. 1 fig.

On the basis of an extensively described experi-
ment the author demonstrates how to determine the
quantity of carbon dioxide and oxygen in inhaled and
exhaled air. The experiment is suitable for human
biology instruction, stresses physiological aspects
and is analyzed also mathematically.

didactics of biology - biology instruction - human
biology - respiration - carbon dioxide - oxygen -
teaching method - experiment - FRG. 147309.

240. PHILLIP, E.:

Wieviel Keime enthält die Luft ? (How many germs are
there in the air ?)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 6, pp. 203-208. Lit. 3, 2 worksheets,
1 fig.

A large quantity of microorganisms are found in
the air, but their actual quantity depends upon a
number of factors, such as the humidity of the air,
etc. Experimentally, the presence of microorganisms in
the air is easy to prove. But the number of species

of microorganism which live in the air is not very large, because these organisms must survive a lack of nutrients, ultra-violet light and often unsuitable humidity conditions. They include staphylococci, streptococci, as well as fungi and actinomycetes in the form of spores. Petri dishes with agar agar can be used to cultivate these bacteria and other microorganisms - at least 40 different methods have been developed for this purpose. Aerobic bacteria are found in the air usually on particles of dust or droplets of water. Also agglomerations of bacteria exist. The author stresses the hygiene aspect of this topic and recommends the use of worksheets for the experiments. The experiment and classwork require 4 teaching lessons.

didactics of biology - biology instruction - microbiology - human biology - hygiene - microorganisms - air - experiment - PRG. 147309.

241. RAŠKOVA, S. - CHRISTOVA, P.:

Ustanovyavane fiziologichnata rolya i nezamenimost na mineralnite elementi v svobodno izbiraemata podgotovka po биологиya v 10 klas (Determining the physiological role and irreplacability of mineral elements within the framework of an elective biology course in the 10th class)
Биологиya i khimiya, 26, 1983, No. 6, pp. 41-45, 51.
Lit. 3, 2 tabs., 1 fig.

The introduction of elective biology courses in general education schools aims at improving the polytechnical aspects of instruction and also the vocational guidance of pupils. The findings of a questionnaire project at the V. Leviski School in Stara Zagora confirm this. Pupils clearly stated their opinions

that the subject is very useful; among the most useful and interesting topics they cited the problems mentioned in the title of this article. The author recommends using a seminar for teaching and giving pupils assignments such as "The history of the discovery of hydropony", "How cultivating solutions and media are made", "The advantages of hydropony," etc. The authors also describe various experiments, some of which require as much as one month to carry out. On the basis of their own findings, pupils learn to draw conclusions which are also valid for agriculture.

didactics of biology - biology instruction - hydropony - experiment - plant physiology - Bulgaria. 147309.

242. SANDER, R. - STOFFEL, R.:

Einfluss unterschiedlichen Konzentrationen von Schwefelsäure auf die Keimfähigkeit und Initialentwicklung von Gartenkresse (The influence of different concentrations of sulphuric acid on the ability of garden cress to germinate)

Der Biologieunterricht, 19, 1983, No. 4, pp. 113-118. Lit. 7, 1 fig.

The author describes a project undertaken by two secondary school pupils who studied the influence of sulphuric acid upon the early stages of germination of Garden cress plants (*Lepidium sativum*). This work was very timely because due to acid rain every 13th tree in the FRG is already damaged or dying. In the FRG 7 million tons of SO_2 are discharged into the air annually, but also the influence of O_3 is important. Sulphuric acid was found to be more suitable for this experiment than sulphurous acid; solutions with concentrations between 0.9 and 0.001 were studied in the project.

didactics of biology - biology instruction - environmental conservation - sulphuric acid - acid rain - experiment - FRG. 147309.

243. SCHÜNEMANN, J.:

Ein Modellexperiment zur Osmose (A model experiment on osmosis)

Biologie in der Schule, 32, 1983, No. 9, pp. 359-360. 1 fig.

The clarification of the physical essence of osmosis is difficult for pupils to learn. Various teaching aids should be used for teaching this topic - for instance aids which are usually found in physics where they are used to explain the kinetic theory of gases. The author describes in detail how such an instrument can be made and how it can be utilized in biology instruction, to explain the essence of osmosis.

didactics of biology - biology instruction - physiology - osmosis - interdisciplinary relations - physics - experiments - GDR. 147309.

244. SERBIN, S.P.:

K izucheniyu funktsii glaz (Studying the function of the eyes)

Biologiya v shkole, 57, 1983, No. 2, p. 47.

Pupils have difficulties with learning about the structure and function of the eyes; this subject-matter is found in various topics: anatomy, physiology, human hygiene and in the special course "The physiology of animals". Most of the difficulties concern the creation of an observed image on the retina. Pupils tend to mistrust the claim that the

optical image of an object on the retina is upside down. Since the principles of optics have not yet been studied by these pupils, a biology teacher must extend a great deal of energy to convince pupils that this is so. Here the author suggest providing experimental proof on the basis of an experiment with the eye of an albino animal, for instance a rabbit. In albinos, there is no pigment in the eye and so the creation of an image on the retina can be directly observed. The author describes the whole experiment in detail and also lists the needed instruments and other facilities.

didactics of biology - biology instruction - human biology - physiology - sight - experiment - USSR.
147309.

245. SHEFFIELD, E. - ATTREE, S.M.:

Further Experiments with Ferns in Culture:

Regeneration

Journal of Biological Education, 17, 1983, No. 3,
pp. 183-184, Lit. 8, 2 figs.

Pteridophyta cultivated in a cultivating medium provide abundant and easily used material for a wide range of experiments and observations. The article provides information on the opportunities provided by the versatility of angiosperms for their use in laboratory exercises concerning the regeneration of tissues, as well as morphological exercises which deal with the life cycle of ferns. On the basis of the authors' instructions, teachers can easily begin with the cultivation of ferns with spores obtained from wildly growing plants. The experiments concern the chemotaxis of gametophytes, fertilization, photo-

morphogeny, morphology, the isolation of the proto-plast and gametophyta, the properties of cellular walls and membranes, cellular poisons, apogamic life cycles, etc. Also the species of ferns recommended are listed.

didactics of biology - biology instruction - botany - plant physiology - ferns - regeneration - experiment - Great Britain. 147309.

246. SCHARF, K.:

Die "Kurzhalshypothese". Zur Möglichkeit von Kaspar-Hauser Versucher in der Ethologie (On the "short neck" hypothesis. Concerning the opportunities provided by the Kaspar Hauser experiments in ethology) Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 12, pp. 374-387. 7 texts, 8 figs., 1 teaching supplement.

On the basis of interdisciplinary relations between biology, chemistry and physics the author describes model experiments, which indicate how ions penetrate a membrane in concentrated fallout. The experiments are linked to the diffusion of matter and osmosis and make it possible to achieve a deeper understanding of these phenomena. On the basis of several examples from zoology the author demonstrates that the organisms of animals have developed mechanisms which act against physiologically unwarranted concentrations of various substances. This subject-matter is recommended for the lower classes of secondary school where membrane permeability is taught.

didactics of biology - biology instruction - physiology - experiments - diffusion - osmosis - FRG. 147309.

247. SCHULTZE, H. - STEPALMANN, U.:

Das aktuelle Unterrichtsziel: Die Hill-Reaktion in vitro - Vorschläge für eine vereinfachte Durchführung
(A current teaching objective: Hill's reaction in vitro - suggestions for a simplified version)
Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 5, pp. 155-162. Lit. 9, 1 worksheet.

The authors here provide suggestions for the simplification of an experiment in which Hill's reaction is demonstrated. Usually without very high quality laboratory equipment it is extremely difficult to do plant physiology experiments. In the simplified version, which the authors have tested, isolation and suspension environments are used to isolate chloroplasts with^{the} aid of overcooled tap water. Technical instructions are provided for this purpose, specifically for making chloroplast suspensions for the visual observation of Hill's reaction. Also the photometrical properties of Hill's reaction can be studied by this experiment.

didactics of biology - biology instruction - botany - plant physiology - photosynthesis - chlorophyll - experiment - FRG. 147309.

248. WALTERS, D.R. - AYERS, P.M.:

Class experiments with powdery mildews
The School Science Review, 64, 1983, No. 229, pp. 688-690. Lit. 2, 2 figs.

Powdery mildews are important and dangerous plant diseases which are economically very expensive. Their biology has been explained and they represent an ideal object for school observations and experiments

in biology laboratories. Leaves attacked by these fungi can be easily acquired and the spores easily collected. The mildews vegetate for long periods of time on the leaves of the host plant and are transmitted by the wind; they are easily observable. The authors cite powdery mildews which are specifically suitable for school experiments, their life cycle and specific symptoms of the disease. On the basis of their biochemical and physiological study, students also study the plant's resistance to the mildew and possible methods of prevention.

didactics of biology - biology instruction - fungi - mildew - observations - experiments - resistance to disease - Great Britain. 147309.

249. WALKER, A.J.:

The compound interest law and plant growth: a cautionary note

Journal of Biological Education, 17, 1983, No. 3, pp. 243-244. Lit. 7, 1 fig.

Students discuss and analyze growth rates of young plants in a project which studies growth rates and units of time usually used to determine increments of growth. Plant growth rates sometimes emulate compound interest growth rates, but the author warns that mathematical applications should be used with caution in the world of living organisms. In the project, students study the growth of a plant during a period of 21 days and also the weight increments achieved during this period.

didactics of biology - biology instruction - botany - physiology - growth - experiments - Great Britain. 147309.

250. WESTERWORTH, F.:

Schulversuche zur Ökologie des Bodens mit einfachen Mitteln im Biologieunterricht (School ecological experiments concerning the soil, with simple media in biology instruction)

Der mathematische und naturwissenschaftliche Unterricht, 36, 1983, pp. 499-503. Lit. 5, 9 figs.

The article describes simple experiments with soil, which have an ecological objective. The media and facilities needed for these experiments are fairly simple; they make it possible to observe the succession of heterotrophic soils and soil organisms, while taking ecological aspects into consideration in terrestrial permanent eco-systems. The author explains the notions of an ecological niche, ecological potential, the principle of competition, the predator-victim relationship, the succession of organisms and the impact of abiotic and biotic factors. The materials required for these experiments are described in detail, as well as the course of the experiments.

didactics of biology - biology instruction - pedology - ecology - succession - microorganisms - experiments - FRG. 147309.

10. Biology instruction media

251. ČIPEROVÁ, M.:

Řízení, didaktické postupy a materiální didaktické prostředky (Control, didactical procedures and material didactical media)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No. 3, pp. 36-37.

The author defines didactical procedures which are suitable for properly controlled class work by pupils. The purpose and aims of the teaching structure we are dealing with should first be precisely defined. The initial situation among pupils should first be determined and then on this basis a project drawn up to regulate the further educational and teaching influence of pupils, while at the same time making use of feedback to adjust this regulation according to its impact. The author also stresses the need to take the real situation among pupils into consideration when writing and designing new textbooks and teaching media of all kinds.

didactics of biology - biology instruction - teaching media - Czechoslovakia. 147311.

252. Equipment News

Journal of Biological Education, 17, 1983, No. 1, pp. 15-16. 3 photos.

New equipment suitable for schools and school laboratories and offered by various commercial firms is described. Philip Harris offers a series of 24 pieces of laboratory equipment, including an energy source,

time switches, counters, pH meters, a portable oximeter and various graphical recording instruments. Griffin and George offer entomological specimens to show the development of insects, specimens mounted in liquids (the development of rats), washable wall pictures for human biology and plant anatomy, three-dimensional pictures for human biology, the model of a rat, anatomical models for human biology, illuminometers, microscopes and a special mixing device. Another firm supplies various items needed in the laboratory.

didactics of biology - biology instruction - teaching media - laboratory supplies - Great Britain. 147311.

253. GAVRILOV, G.V.:

Kak priobresti nagladnye posobiya (How to obtain ostensive teaching aids)

Biologiya v shkole, 57, 1983, No. 6, pp. 65-66.

The editors of the journal often receive letters from biology teachers from the whole country who ask about how to obtain a specific teaching aid, for instance school films or slides. The chief of a section at the Ministry of Education here strives to answer these questions. Teaching media can be bought by schools from a special enterprise; they should be ordered by mail. The requirements of a school must be supported by a document issued by the Ministry of Education. The list of available equipment and various other aids includes 530 items and will be shipped out to school in the period 1981-1985. A survey of some of these media is provided in the article, specifically slide series on nature conservation and the laws of heredity; these aids are described in detail.

didactics of biology - biology instruction - teaching media - slide series - USSR. 147311.

254. KEBERTOVÁ, J.:

Prostředky výuky pro botaniku v 5. ročníku základní školy (Teaching media for botany in the 5th class of basic school)

Učební pomůcky v škole a osvětě, 22, 1982-1983, No. 10, pp. 150-155.

The teacher of a basic school in Hořovice prepared a pedagogical reading concerning teaching aids and media used in botany instruction in the 5th class. She considers fresh plant material to be the most valuable type of teaching aid. For the winter months she herself makes herbal specimens, as well as specimens mounted in liquids, under glass, etc. She also makes use of small-scale illustrations found in old textbooks and magazines and she makes models, slide series, etc. didactics of biology - biology instruction - teaching media - original objects - botany - Czechoslovakia. 147311.

10.1. Individual types of media, their importance

255. FLANNERY, M.C.:

Teaching and the Media

American Biology Teacher, 42, 1963, No. 5, pp. 282-285.

In the USA a paradoxical situation is developing because in spite of public interest in science, the quality of science instruction is declining. In school, students acquire increasing amounts of knowledge or rather science information, but often do not come into contact with original natural objects, immediate

observations of natural processes or experiments. On the basis of specific examples the author discusses how to make use of various local resources and how to improve instruction by using a larger number of original objects.

didactics of biology - biology instruction - teaching media - original objects - USA. 147311.

10.1.1. Studying the didactical value of media used in biology instruction

256. ŠURLÁK, Š.:

Problémy s materiálními didaktickými prostředky

(Problems with material didactical media)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No. 3, p. 44.

The author of the article outlines the main problems which are encountered in the use of various teaching media and aids at a meeting of readers organized by the editors of this journal. The most important problems concern the fact that there is a shortage of some media, many schools have obsolete media, teachers must overcome a large amount of red tape when they acquire new teaching media, some school do not have sufficient resources for buying what is available on the market, some schools have difficulties with storing their media and with maintaining up to date records on available supplies of teaching media. The author discusses a number of remedies to these problems and suggest publishing a booklet containing instructions and valid regulations for the use of teaching media in Czechoslovakia.

didactics of biology - biology instruction - teaching media - Czechoslovakia. 147311.

10.1.2. Principles for providing schools with media for biology instruction, keeping records on teaching media

257. KOUBA, L.:

Plnění plánu NIOKR v ČSSR (Fulfilling the NIOKR plan in Czechoslovakia)

Učební pomůcky ve školství a osvětě, 22, 1982-1983, No. 3, pp. 35-36.

A unified ministerial plan of research into problems of the school system includes in its section no. II, the main task (II - 08): "A study of the design and utilization of material didactical media for basic and secondary schools". The research project has the following structure: 1st sub-task: A forecast of the development of material didactical media for basic and secondary schools until the year 1995. 2th sub-task: The development of new media, didactical technology and other school furnishings, including the modernization of manufactured media. 3rd sub-task: The methodology of using material didactical media in the educational and teaching process. 4th sub-task: The development of a comprehensive material foundation for instruction in basic and secondary schools from an architectural point of view. 5th sub-task: The training and post-graduate training of educational personnel specialized in the use of material technical media in the educational and teaching process in basic and secondary schools. 6th sub-task: The development

of a theory for the design of material technical media for basic and secondary schools. The scientific objective of this research project is to verify the effectiveness of including the system of material technical media into modern methods and forms of instruction.

didactics of biology - biology instruction - teaching media - research - teaching media - basic school - secondary school - Czechoslovakia. 147311.

258. SLIVKA, J.:

Evidence didaktickéj techniky na školách (Keeping records on available didactical technology in schools)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No. 3, pp. 42-43. 3 figs.

School are continually acquiring new teaching media of various kinds. This makes certain demands upon sufficient space to store these media. Schools should have on their staff instructors for the use of didactical technology, who would prepare the required media and also maintain the required documentation on them. Such instructors should be trained by local Regional Pedagogical Institutes. The author also discusses methods of listing or catalogization of didactical technology. He recommends that each instrument, device of specimen have its own card with its inventory number, where its use is registered, as well as all repairs, etc. These cards should contain all technical data required by the user, the year the aid was made, its price and other data. This system of records is of advantage to the school because it facilitates inspection.

didactics of biology - biology instruction - teaching medium - records - didactical technology - Czechoslovakia. 147311.

10.2. Original live objects

259. KEBERTOVÁ, J.:

Prostředky výuky pro botaniku v 5. ročníku základní školy (Teaching media for botany in the 5th class of basic school)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No.10, pp. 150-155.

A teacher from a basic school in the town of Hořovice, in the form of a pedagogical reading describes teaching aids for botany classes in the 5th grade of basic school. She considers original objects as most important, especially fresh plants which during the winter months are replaced by preserved or mounted plants made during the summer months, as well as with pressed material, specimens mounted in fluids, under glass, etc. She also uses aids made of pictures from old textbooks, models and the audio-visual aids available in the school.

didactics of biology - biology instruction - botany - teaching media - basic school - 5th class - Czechoslovakia. 147311.

10.2.3. Living nature rooms or corners in schools

260. JORDAN, C.:

Partnerfindung - Partnerbildung bei Tierprimaten,
Hinweise zur Evolution Entstehung der menschlichen
Kernfamilie (Seeking spouses - links among spouses
in primates. Indications of an evolutionary develop-
ment of human nuclear families)

Naturwissenschaften im Unterricht - Biologie, 31, 1983,
No. 4, pp. 123-130. Lit. 11.

The author discusses the choice of spouse and the links which exist between spouses among primates. Essentially the problem concerns the significance which the behaviour of primates has for human behaviour, in the context of evolution. The findings of research cannot simply be transferred from one species to another, or only hypothetically so. The author discusses studies concerning the limits of social organization among primates and the mutual linking of males and females, the relations between the female and her progeny, among siblings, relations between a father and his progeny, the harem which the Hamadryas baboon forms, the presidium of old monkeys which rules Macaque rhesus communities, the marital relations between pairs of the Hylobates gibbon or the Siamang gibbon. The problem is whether these forms are hereditary and whether they have any bearing upon such relations among humans. In conclusion the author suggests devoting attention to this problem in biology teaching in the form of a project.

didactics of biology - biology instruction - primates
humans - social relations - original objects - FRG.
147311.

10.2.6 Breeding animals in schools, breeding facilities,
the collection of animals. Calendars for
collecting fauna.

261. BARKER, J.A.:

The Giant Nematode "Nematodius" ssp.

Journal of Biological Education, 17, 1983, No. 3,
pp. 199-200. 1 tab.

The author points to the possibility of breeding the Giant nematode in school laboratories. He recommends two species: *Nematodius matchstickius* (which is 44 mm long) and *Nematodius cocktailius* (which is up to 75 mm long, but slimmer). Both species are described, as well as their distinguishing characteristics, their geographical incidence, reproduction system and behaviour. The author also describes various experiments which they can be used for and their use in classwork.

didactics of biology - biology instruction - zoology - worms - breeding - observations - experiments - Great Britain. 147311.

262. EDIGER, M.:

Our Pets

Teaching Science, 1, 1983, No. 3, pp. 73-75.

Many primary school pupils have house pets at home, for instance dogs, cats, turtles, rabbits, aquarium fish, etc. Pupils observe them, study their behaviour and gain basic knowledge concerning their lives (their growth, locomotion, feeding habits, respiration, reproduction). This type of knowledge should be made use of in zoology instruction, it represents outstanding motivation and provides opportunities for discussions on these subjects in class. The author

describes how to proceed in making use of what children know about their pets.

didactics of biology - biology instruction - house pets - breeding animals - Great Britain. 147311.

263. McCURE, J.W.:

Cold Weather Entomology

The Science Teacher, 50, 1983, No. 1, pp. 48-51. Lit. 9, 1 fig.

The collection of insects requires a long-term interest in the subject and special skills and equipment. It can usually also be carried out only in some seasons of the year. During the summer large quantities of insects can be collected, but in the winter this is more difficult. The author shows that also in the winter months insects can be collected, but they must be sought under the bark of trees, in hollow trees, in humus, or the soil found in forests. Besides insects, also spiders and crustaceans can be found. The author describes these collections and techniques for their identification. The identification of pupa and larvae is more difficult. Insects can also be found on fields in remnants of maize or in orchards.

didactics of biology - biology instruction - insects - entomology - observations - winter - collections - USA, 147311.

264. PARKIN, M.A.:

A Simple Watering Technique for Locust Egg-laying Tubes

The School Science Review, 65, 1983, pp. 296-297.

In nature, locust lay their eggs only into soil which must have a specific degree of moisture. Before laying the eggs the female will determine the moisture of the soil with her ovipositor. The author describes the design of special tubes into which locust lay their eggs. The tubes contain moist soil: 15 parts water are added to 100 parts sand. After filling, the tubes are sealed so that the water does not evaporate. The author also describes the whole apparatus for breeding locust in the laboratory and the conditions they need for laying eggs.

didactics of biology - biology instruction - zoology - insects - orthoptera - breeding - Great Britain.
147311.

265. RAMUS, Z.:

Hodowle bezkręgowców i doświadczenia (Breeding invertebrates and experiments with them)
Biologia w szkole, 36, 1983, No. 1, pp. 28-34.

The author discusses breeding invertebrates in school living nature rooms and indicates opportunities for using what has been bred in school instruction. He discusses specifically protozoa (flagellates, eugena, rhizopodia) and amoeba (ciliata, paramecium, stentor and others). Special attention is devoted to pure cultures of paramecium and their use in laboratory work. Also coelenterata are discussed, specifically hydrda grisea, various specie of flatworms, Annelia

earthworms, as well as Enchytraeus worms and leeches. Among arthropoda the following crustaceans are dealt with - crayfish, the water flea and copepods, among insects the cabbage butterfly, the stick insect, the yellow mealworm, the cockroach and among the Arancea some spiders. Among the molluscs, snails, freshwater mussels and Anodonta cygnea shellfish. Instructions for breeding are always combined with a discussion of the animal's use in class or laboratory work.

didactics of biology - biology instruction - zoology - breeding + invertebrates - living nature room - observation - experiment - Poland. 147311.

266. REISS, J.:

Das Aquarium als Lebensraum für Fisch und Pflanze.

Einfache Untersuchungen über das Zusammenwirken
Ökologischer Faktoren (An aquarium as a living environment for fishes and plants. Simple studies on the mutual influence of ecological factors)
Naturwissenschaften im Unterricht - Biologie, 11,
1983, No. 12, pp. 425-428.

When beginning an aquarium, mutual ecological relations should be kept in mind, specifically between fishes and plants. Plants during the daytime produce oxygen due to photosynthesis, while the fishes produce carbon dioxide and nitrates. Usually a state of equilibrium in an aquarium is threatened by too many fishes bred in them. The plants are unable to deal with all the nitrates created, ammonia forms in high concentrations which harm both plants and animals. The author explains how, on the basis of very simple equipment, the teacher can demonstrate the influence of both the fishes and plants upon the environment.

Various chemical analyses of the water can be made, to determine the quantity of pH, calcium, ammonia, nitrates, oxides, oxygen, chlorides and various other indicators. Various fish are recommended for breeding in the aquarium and the whole experiment is described.

didactics of biology - zoology instruction - ecology - aquariums - observations - experiments - FRG. 147311.

267. ROWLANDS, W.O.:

Culturing Soil Nematodes

The School Science Review, 65, 1983, No. 231. p. 298.

The author discusses traditional methods used to collect nematodes with the help of a Tulgreen funnel. The nematodes crawl through the soil to get away from layers heated by a bulb, to the cooler and more moist layers underneath and thereby fall into the funnel and into a collection vessel. The author suggests various improvements on this method.

didactics of biology - zoology instruction - nematodes - breeding - collection - Great Britain. 147311.

268. STRAUBE, W. - LIMPACH, M.:

Sammeln und Untersuchen von Plankton (The collection and study of plankton)

Biologie in der Schule, 32, 1983, No. 11, pp. 451-456. 8 photos.

The authors, on the basis of experience from teaching in postgraduate courses, first describe procedures used for the collection of plankton, then its identification and the mounting of various organisms. Plankton includes a number of organisms such as: vorticella, diatoms, blue-green algae, green algae,

protozoa, coelenterata, nematodes and crustaceans. The author also points out some rare species and explains how to identify them.

didactics of biology - biology instruction - post-graduate study - plankton - field work - GDR. 147311.

269. VOLKOV, V.A.:

Odin iz sposobov prigotovleniya kultury infusoriy

(One of the methods of cultivating ciliata)

Biologiya v shkole, 57, 1983, No. 2, p. 31, lit. 2.

When teaching the topic "The class of ciliata" in the zoology course, a living specimen should be demonstrated - the author recommends a paramecium for this purpose. Since the time of year when this topic is taught is not favorable for collecting specimens in water areas, it should be bred in the laboratory. The literature describes several methods for doing so, the best is probably using a mixture of water and hay. But the author suggests an even simpler method, which does not require any preparation. Pupils can observe the feeding of the paramecium.

didactics of biology - zoology instruction - protozoa - breeding Ciliata - USSR. 147311.

10.261 Zoological gardens

270. DORIAS, H.W.:

Biologieunterricht und Tierpark (Biology teaching and zoological gardens)

Biologie in der Schule, 32, 1983, No. 12, p. 498.

On July 12th to 15th 1983 the 16th annual course on "Biology teaching and zoological gardens" was held in Berlin. The course was aimed specifically at school teachers and stressed various aspects of school work in biology. Ecological factors in the study of animals were stressed and the behaviour of animals in captivity, as well as new findings in the study of primates. didactics of biology - zoology instruction - zoological gardens - excursions. GDR. 147311.

271. HENSON, E.:

Rare Breeds on the Cotswold Hills

Journal of Biological Education, 17, 1983, No. 3, pp. 189-191. 5 photographs.

The Cotswold Park is found in the Cotswold Hills, near Stow-on-the-World in Gloucestershire. In spite of the fact that the park is not a zoological garden, it is in fact similar to one: domestic animals which are no longer common are bred here. The farm with these animals is managed by Joe Henson and John Neave. They have 17 different breeds of old English sheep, 7 breeds of domestic cattle, 3 breeds of pigs, 2 breeds of goats and 3 breeds of horses. The animals serve not only to illustrate the development of English animal husbandry, but can also serve as a gene pool.

didactics of biology - zoology - animal breeding -
history - zoological garden - Great Britain. 147311.

10.27 Cultivating plants, hydroponics

272. DYER, A.T.:

Fern Gametophytes in Culture - a Simple System
for Studying Plant Development and Reproduction
Journal of Biological Education, 17, 1983, No. 1,
pp. 23-39.

The gametophytes of ferns are easy to cultivate and can serve as very good illustrations of the principle of the alternation of generations in the life cycle of plants. This type of work is interesting, simple and helps to form the basis for a more profound study of botany. The author describes the technique of starting the culture, cultivating the gametophytes, the required sterilization of the environment and inoculation of spores. Attention is devoted not only to homosporic, but also to heterosporic ferns. The genetics and biology of ferns are discussed in detail. The experimental cultivation of ferns can be very interesting and provides both teachers and their pupils with the opportunity of interesting laboratory work.

didactics of biology - botany instruction - ferns -
life cycle - laboratory work - Great Britain.
147311.

273. HABERNÁLOVÁ, J.:

Pěstování rajčete jedlého ve školních podmínkách
(Cultivating tomatoes in school)

Přírodní vědy ve škole, 34, 1982-1983, No. 5,
pp. 170-171.

2 photographs, 1 tab.

The author describes the cultivation of tomatoes in a basic school in the Prague district of Strašnice. She uses the heat provided by the central heating of the school building and describes various other aspects of this project, for instance mixing the correct soil mixture (with sand, compost and peat). The pupils help in the cultivation, observe rates of growth and measure the crop.

didactics of biology - botany instruction - cultivation - vegetables - Czechoslovakia. 147311.

274. KROPOTOVÁ, I.I.:

Kak vyrazit shenshen (How to cultivate ginseng)

Biologiya v shkole, 57, 1983, No. 5, pp. 73-75.

3 figs.

Ginseng (*Panax ginseng*) grows wildly in the Far East, but in the wilderness it grows very slowly, while under cultivation it will bloom for the first time already in 4 to 6 years. It can be cultivated from seeds which, however, must first be stratified. The author discusses techniques for this stratification and the planting of the seeds, the type of soil required by the plant, intensity of required light and protection from the cold.

didactics of biology - biology instruction - botany -
cultivating plants - school plot of land - USSR.
147313.

275. VYMAZAL, V.:

Výchova naruby aneb Homo panelakus mezi kvíčkami
(Up-side-down education or Homo Housing Estaticus
among the flowers)

Věda a technika mládeži, 17, 1983, No. 13, pp.404-405.
3 figs.

Greenery is often lost among the prefab houses
of housing estates and some people even dig up
flowers to take to their private cottages and
gardens. The pupils of a general education secondary
school undertook an interesting experiment:
they planted 522 plants of 10 different species
in a small city park and observed how long the
plants remained in their beds. But the more plants
are planted, the fewer are stolen.

didactics of biology - biology instruction - urban
greenery - Czechoslovakia. 147313.

10.271 A school plot of land, botanical gardens, young natural scientist stations, school biology centres, school forestry areas, science trails

276. YEGOROVA, A.:

Vse rezervi na vypolnenie Prodovolstvennoy programi
(All reserves should be mobilized for fulfilling the Food Program)

Biologiya v shkole, 57, 1983, No. 2, pp. 65-66.

The author informs readers about the work done by pupils on a school experimental plot of land at the Tandin secondary school in the Yakutsk Autonomous Soviet Socialist Republic. In spite of very hard climate (in the winter temperatures drop to -66°C , there is snow until the beginning of May and in July temperatures reach $+35^{\circ}\text{C}$), pupils cultivate vegetables in greenhouses and have been very successful with cucumbers, red beets, carrots, potatoes and radishes. They have also experimentally shown which strains of cereals, tubers and vegetables yield the best crops. Their crop is given to the local state farm, where they also help out in the form of voluntary work. They also pass out seedlings for the cultivation of tomatoes and cucumbers free of charge to anyone who is interested in cultivating these plants. The author cites specific facts about the activities of the pupils in this area, which are done within the framework of the Food Program, announced by the May Plenary Session of the Central Committee of the Communist Party of the Soviet Union in 1982.

didactics of biology - biology instruction - cultivating plants - vegetables - school plots of land - USSR. 147311.

277. KOZLOVSKAYA, A.V.:

Kak mi provodim polevie obsledovanie pochvy na shkolnom uchastke (How we carry out a study of the soil on the school plot of land)

Biologiya v shkole, 57, 1983, No. 6, pp. 62-63.

A study of the soil can be carried out on a school plot of land. Pupils assess the fertility of the soil and learn to determine the correct amounts of fertilizer needed for a specific purpose. The author describes the methodology of these activities where samples are taken and laboratory analyses made to determine the colour and structure of the soil and especially the amount of moisture it has and the relations of various chemical components.

didactics of biology - biology instruction - school plot of land - pedology - fertilization - laboratory work - USSR. 147309.

278. PODDUBNAYA, L.V.:

Kak u nas organizovana rabota na shkolnom uchastke (How we organize work on our school plot of land)

Biologiya v shkole, 57, 1983, No. 3, pp. 65-66.

The article sums up the experiences of a secondary school in Volgograd. The work done on the school plot of land is linked to biology teaching, as well as the activities of young natural science

hobby clubs and practical work done by pupils during the summer vacation. All classes participate in this work throughout the whole year. The plot of land is divided into three parts, according to the age group of the pupils who work on it. Vegetables, flowers and medicinal plants are cultivated and there is also an orchard and a greenhouse. A special section devoted to experimental cultures is cultivated together with students from Pedagogical and Agriculture Faculties who help pupils to do interesting experiments. The fruits and vegetables harvested on the school plot of land are given to the school dining room. The work contributes to the vocational guidance of pupils, they learn how to cultivate their own gardens and become interested in nature and natural studies.

didactics of biology - biology instruction - plant cultivation - school plot of land - USSR. 147309.

279. SCHWARZ, U.:

Der Naturgarten (A nature garden)

Der mathematische und naturwissenschaftliche

Unterricht, 36, 1983, No. 2, pp. 100-103.

One of the possibilities for saving threatened species of plants and animals is to create gardens which simulate the wilderness, where plants from the vicinity can be cultivated and opportunities created for various animals to nest or breed. In the FRG 44 % of all nesting birds are threatened. If measures are not taken for their conservation, as well as saving other threatened species, very

soon only people, domestic animals and cultivated plants will exist. Greenery in villages or urban areas should also have this purpose. The author discusses sources for obtaining suitable plants for planting and provides suggestions for planning such wilderness gardens.

didactics of biology - biology instruction - school plots of land - plant conservation - wilderness gardens - animal conservation. FRG. 147311.

280. Shkolnomu uchastku - vnimanie i zabotu !

(Attention and care should be devoted to school plots of land)

Biologiya v shkole, 57, 1983, No. 1, pp. 47-54.

The article acquaints readers with the course and outcome of a round table discussion convened by the Ministry of Education of the USSR, in which biology teachers, principals of schools and members of the staff of the Ministry participated. The discussion concerned the utilization of school plots of land in biology instruction, as well as in vocational training towards occupations in agriculture. At present, when the Food Program of the Party is being implemented, it is important that pupils become acquainted with its purpose and objectives. Work on a school plot of land can contribute to this. The article also describes briefly the subject-matter with which various participants in the discussion contributed to it. In conclusion suggestions are made for the organization of such discussions among other biology teachers.

didactics of biology - biology instruction -
teaching media - school plot of land - vocational
guidance - occupational training - USSR. 147311.

281. ZAKHARCHENKO, G.G.:

Formirovaniye ekologicheskikh znaniy u uchashchikhya
v processe opitnicheskoy raboti v shkolnikh lesni-
chestvakh (Teaching ecological subject-matter
to pupils in the process of experimental work in
school forestry operations)

Biologiya v shkole, 57, 1983, No. 3, pp. 67-71.

The tasks connected with nature conservation and the rational utilization of the natural wealth of the country, as defined by the 26th Congress of the Communist Party of the Soviet Union, require further improvements in teaching ecology and the education of pupils. The author discusses opportunities for doing so in the context of pupils' acquiring work habits in school forestry operations where there are various opportunities for experimental work. As an example, the author discusses the teaching of ecology according to the biology teaching syllabus for the 10th class, where observations and experiments with preparing the seeds of trees and their planting can be organized, as well as their replanting and a study of their growth. Pupils also have the opportunity to become acquainted with the influence of anthropogenic factors in the period of the scientific and technological revolution and methods which can be used for the conservation of the environment in a forest.

didactics of biology - biology instruction -
nature conservation - forests - ecology - USSR.
147309.

282. ZICHÁČEK, V.:

Botanikové mládeži (A gift from botanists to young people)

Přírodní vědy ve škole, 34, 1982-1983, No. 5, p.172.

The author describes a new botanical garden which has been founded in the city of Olomouc. It has an extensive selection of pine trees, magnolias, perennials, as well as the largest greenhouses for flowers in the country, a large collection of roses and alpine gardens, as well as samples of foreign plants. The lay-out and design of the garden is inspiring for amateur gardeners. The Olomouc Botanical Garden organises various activities for schools (between May 31st and June 5th schools do not have to pay any admission). Schools can also hold botany lessons in the botanical garden all year around.

didactics of biology - biology instruction - botanical garden - Czechoslovakia. 147311.

283. Bolshive i malive problemy shkoloogo uchebno-opitnogo uchastka (Large and small problems of school experimental plots of land)
Biologiya v shkole, 57, 1983, No. 2, pp. 63-65.

An editorial which sums up a number of letters sent to the editors and answers questions which frequently appear in them. For instance who should be the chief of the school plot of land and supervise lessons dealing with agriculture, for how many lessons should the chief of the plot of land actually be present, how should the work of teachers on the plot of land or in the school greenhouse be remunerated, what to do in cases when the crop from the school plot of land is stolen or taken by pupils, what to do when planned and actual financial income from the plot of land differ, how should the work done by teachers on the school plot of land during the summer vacation be remunerated - financially or by giving teachers substitute days off, etc.

didactics of biology - biology instruction - crop cultivation - school plot of land - USSR. 147311.

284. GRUMER, S.:

Ökologie in der Pilzausstellung (Ecology at an exhibition of mushrooms)

Der Biologieunterricht, 19, 1983, No. 4, pp. 69-87.
Lit. 13, 4 worksheets.

The technical secondary school in Pliezhausen, with the help of its pupils, prepared an interesting exhibition for the inhabitants of the town. Hobby clubs from various classes contributed to the exhibition. The topic of the exhibition was "Mushrooms as a Food" and "Ecology and the Significance of Fungi". Three important groups of mushrooms and fungi were shown - saprophytical fungi, parasitical and symbiotic fungi. In preparing the exhibition pupils learnt to identify species of mushrooms and to describe their place in the ecology and their life cycle.

didactics of biology - botany instruction - ecology - fungi - mushrooms - exhibition - FRG.147311.

285. POLLOCK, S.:

An Inside View of Education at the Natural History Museum in London

Journal of Biological Education, 17, 1983, No. 2, pp. 119-122. 6 figs.

The Natural History Museum in London has introduced a new type of exhibition, which for instance deals with human biology or some other topic which is part of the school biology teaching syllabus. Viewers come to the museum to learn. Computers provide an opportunity to try out one's knowledge. A team of educators which includes teachers, members

of the museum staff and also older pupils interested in this work organize various exhibitions and activities connected with them. Annually approximately 250 000 pupils visit the museum. In 1982 a special centre for teachers was opened, they can discuss the subject-matter of the excursion planned for their pupils. Since it was opened, over 2 000 teachers have visited the centre. Very often pupils return to the museum with their parents to have another look at the exhibits.

didactics of biology - biology instruction -
museum - excursion - Great Britain.147311.

286. ZICHÁČEK, V.:

Flora 1983

Přírodní vědy ve škole, 14, 1982-1983, No. 9, p.332.

The author provides information about the annual flower show, called Flora, which is held in the city of Olomouc. Not only the socialist countries participate, but also some very well-known Western European firms. The author describes the history of the Flora flower shows and its success in recent years. The exhibition this year will include besides flowers also garden architecture, flower arrangements and samples of the role which gardens have to play in the conservation of the environment and in nature conservation. The spring part of the exhibition will take place on April 29th to May 5th 1983, the summer part from August 19th to 28th.

didactics of biology - botany instruction - flower
show - exhibition - Czechoslovakia. 147311.

287. Dinosaur Myths and Misconceptions

Teaching Science, 1, 1983, No. 3.

Dinosauruses were studied for the first time in the United Kingdom and the British Natural Science Museum has the best collection of Dinosauruses in the world, with finds from various localities and geological eras. The public shows a great interest in these reptiles. One of the popular misconceptions is that they were always huge, whereas in fact also small Dinosauruses existed. Pterodactyls and Plesiosauruses are not Dinosauruses. The term Dinosaur was first used in 1841 by Richard Owen when describing a small Dinosaur. The British Museum has the complete skeleton of an Iguanodon from Belgium which was found in 1877-1878. The extremities of Dinosauruses are shaped in mammalian type and ^{are} not at all similar to those of crocodiles. Some Dinosauruses had bipedal locomotion. They became extinct 65 million years ago, after living for a period of 140 million years. They lived all over the world. Their descendants are birds. Dinosauruses were thermophilous (warm blooded), reptiles. The author dispells a number of other misconceptions about them and cites the most recent findings. The British Museum also has the best fossile specimens of Archeopterys, the earliest known bird.

didactics of biology - biology instruction - palaeontology - museum - Dinosaur - Great Britain.
147311.

288. KHITSARA, V.I.:

Net tolko chernogo medvedya (Only the Black bear is lacking)

Biologiya v shkole, 27, 1983, No. 3, p. 71.

The author describes a school biology museum attached to the Young Natural Scientist Station in Dzhurdzhushti in the south of the Moldavia Soviet Socialist Republic. The museum was built on the basis of the initiative of teachers and their pupils. The specimens of various species on exhibit either did not survive wounds or had to be killed for various other reasons. There are more than 1200 items including fish, birds and mammals in the museum. Some were recieved from very distant parts of the country. The museum is part of the Young Natural Scientist Sation which is unique as the only such facility found in a village. The Station also has laboratories, a vineyard, vegetable and flower beds and an exhibition of photographs. The only item the Station and museum still lack is a Black bear.

didactics of biology - zoology instruction - museum - Young Natural Scientist Station - USSR. 147311.

289. IGNATEVAM V.N.:

Darvinovskiy muzey i shkole (A museum and school devoted to Darwin)

Biologiya v shkole, 27, 1983, No. 2, pp. 72-75.

6 photos.

The article describes the founding, development and present work of the State Darwin Museum in Moscow, which recently celebrated the 75th anni-

versary of its founding. Darwin's theories were accepted by foremost Russian scientists immediately after they were published. The idea of founding a museum originated with Alexander Fedorovich Kota, who with the support of many others built the museum and was its director until the year 1964. At present the museum has a collection of 100 000 items and is a scientific, research and educational institution of importance for the whole Soviet Union. Annually 700 excursions visit the museum - all excursions are arranged before hand by telephone. The author cites the names and work of various scientists and public figures who have contributed to the development of the museum and who have developed various forms of cooperation with schools.

didactics of biology - biology instruction - general biology - Darwinism - exhibition - USSR.
147411.

290. OLLASON, R.J.:

Interlink - Collaborative Projects in Wildlife, Environmental and Biological Education in Scotland
Journal of Biological Education, 17, 1983, No. 1, pp. 21-22, 1 fig.

In 1973 Raymond Chaplin began to organize an educational department at the zoological garden in Edinburgh to organize the work of the zoo with school children. He also works with the Royal Botanical Gardens in the city where a special section called "The Jungle" provides opportunities for pupils to spend at least two hours among jungle

flora, learning about specific specimens. When they later visit the zoo, they become acquainted with jungle fauna. The Royal Scottish Museum coordinates this work and acquaints pupils with natural history. Projects now in the planning stage include "Cats Throughout the World", "The Fauna of Scotland", "Evolution", "Food and Nutrition", etc. which will be made available to schools at all levels.

didactics of biology - biology instruction - museum - botanical garden - zoological garden - Scotland - Great Britain. 147311.

291. POLLOCK, S.:

The British Museum (Natural History). What's in it for you ?

Teaching Science, 1, 1983, No. 3, pp. 71-73.

The British Museum (its Natural History section) provides large quantities of various information to visitors. It specifically addresses teachers and their pupils who visit the museum in very large numbers - annually about 5 000 school groups come here. The museum also has an extensive library on all branches of the natural sciences, but especially all biology fields, geology and palaeontology.

didactics of biology - biology instruction - museum - exhibitions - Great Britain. 147311.

292. SEDIKH, K.F.:

Ispolzovanie materialov shkolnogo muzea biologii v uchebno-vospitatel'noy rabote (Making use of the exhibits in a school biology museum in the course of educational and teaching work)

Biologiya v shkole, 57, 1983, No. 2, pp. 38-40.

Lit. 1, 1 fig. 1 photo.

The author describes the activities of a school biology museum found in the city of Ukhta (ASSR). The museum is run by pupils from the 5th to 10th classes and it is visited by the citizens of the city. The exhibits are also used in the course of biology instruction in the school and in adult education. The author describes the various sections of the museum. Pupils come to the museum for some teaching lessons, where demonstrations are held and pupils become acquainted with various natural objects. Also hobby clubs and elective courses in various biological specializations are held here. The author stresses the very positive educational work done by this facility and the methods with which it implements the regional principle of instruction.

didactics of biology - biology instruction - museum - hobby clubs - elective course - USSR. 147311.

10.51 Microscopy specimens of plants

293. CLAY-POOLE, S.T. - SLESNICK, I.L.:

The Beauty and Biology of Pollen

The American Biology Teacher, 45, 1983, No. 7,
pp. 366-370.

Lit. 5, 10 figs.

The invention of an electronic scanning microscope has made it possible for us to discover the beauty of pollen grains. Pollen grains are a very good object for study in biology and palaeontology. The sculpture of the pollen grain surface provides a very good distinguishing sign for the pollen of various species of plants. In palaeontology pollen grains are very important for determining more or less precisely the age of various specimens which contain fossil pollen grains. The surface of the grains is composed of two layers, an external exine layer and an internal intine layer. The exine structure is characteristic for the family, order and species of the plant and sometime even for higher systematic units. Under anaerobic conditions the pollen grains are highly resistant to destructive factors and become fossils for indefinite periods of time. The author discusses pollen in general, the pollen of anemophilous and entomophilous plants, the possibility of studying the pollen of contemporary plants in magnifications provided by the microscope (400 times), the observation of a pollen tube in a germinating pollen grain, etc.

didactics of biology - botany - microscopic specimen -
pollen - palaeontology - USA. 147311.

294. EISBEIN, K.:

Laubblätter im Elektronenmikroskop (Tree leaves
under an electron scanning microscope)
Biologie in der Schule, 32, 1983, No. 4, pp. 151-152.
17 photos.

In biology courses, when subject-matter concerning plant anatomy and physiology is taught, the structure and function of leaves is also discussed. Pupils learn that the size and shape of leaves tends to variate to a large degree, but that their internal structure is more or less identical. The pattern and structure of leaf surfaces is important especially for phytopathology. An electron microscope makes it possible to answer questions of the relation between the mesophyll of the leaves and the attack of pests. The author provides brief comments on photographs accompanying the text, some of which show the surface of a leaf under an electron scanning microscope.

didactics of biology - biology instruction - botany -
microscopy specimens - electron scanning microscope -
GDR. 147311.

295. HARMING, R.:

Basic Microphotography

The American Biology Teacher, 45, 1983, No. 7,
pp. 399-401.

Lit. 2, 6 photos.

The author describes techniques used in micro-photography with the use of a 35 mm camera, adapter for a microscope and the microscope itself. Also a special film is needed, which is highly sensitive to light and has a very high number of particles per unit of area. He recommends special types of films made by the Kodak company and describes in detail how to use them. The author also stresses the advantages of using microfilms and microslides made by students in the course of biology instruction.

didactics of biology - micro-photographs - microscope - micro-slides - USA. 147311.

296. CHRISMAS, M.:

A Simple Method for Making Permanent Slides of Stomata

The School Science Review, 65, 1983, No. 231,
pp. 297-298. 1 photo.

Determining the number of stomata on the underside of a leaf can be done by several methods: on submerging leaves in water and counting the number of air bubbles which rise to the surface, or better by a microscopy observation of the area. Also nail-polish can be used, which is painted on to the leaf and when it dries, it can be peeled off and the number of stomata which made their

impression on the film of polish counted. The author describes a similar, but improved method which provides a fine imprint of stomata.

didactics of biology - botany instruction - microscope - stomata - Great Britain.147311.

10.52 Microscopy specimens of animals and those pertaining to human biology

297. ALTMANN, A.:

Mikroskopický preparát pro pozorování houbovité struktury plicní tkáně (A microscopy specimen for observing the sponge-like structure of lung tissue)

Přírodní vědy ve škole, 34, 1982-1983, No. 9, pp. 332-333.

The author describes the making of a microscopy specimen of the lung tissue of a rat. The lungs should first be dried in warm dry air (at 100 °C) during 24 hours. 1 mm thick slices are then cut from the lungs and these are set in a special glue, covered by a slide and observed. The specimen has unlimited durability.

didactics of biology - zoology instruction - microscopy specimen - mammal - rat - lungs - Czechoslovakia. 147311.

10.61 Models

298. BARKER, J.A.:

Support Your Local Dinosaur ! - A Survey of
Dinosaur Teaching Resources

Journal of Biological Education, 17, 1983, No. 2,
pp. 149-158. 2 figs.

The author has compiled a list of the opportunities for learning about Dinosauruses available in the United Kingdom. This lengthy list includes audiovisual media, models of various sizes, fossil copies, film cassetts, wall pictures, films, slides and slide series, books for young people and for those over 16 years of age, as well as excursions to museums.

didactics of biology - zoology instruction -
palaeontology - Dinosaurus - teaching media -
Great Britain. 147311.

299. GRINDA, I.:

Schüler bauten Funktionsmodell zur Kiemendarm
von Branchiostoma lanceolatum (Pupils make a

functional model of a pharynx with gill-slits of
Branchiostoma lanceolatum)

Biologie in der Schule, 32, 1983, No. 11, pp. 442-
-443. 2 figs.

To better understand the structure and function of the gill pouch of the lancelet mentioned in the title, the author, together with her pupils, made a model of the animal's pharynx and gill slits; the making of the model is described in detail. It is

made of wooden plates and other components.

didactics of biology - zoology instruction - model -
teaching medium - lancelet - chordata - GDR.

147311.

300. INGLESBY, D.:

Lung Model

The School Science Review, 64, 1983, No. 228, p.500

This ingenious model made by the author demonstrates the size of the respiration surface of the lungs with the help of plastic bags, a glass and a rubber tube (which represents the windpipe). A crushed plastic bag is put into a glass. The bag represents the surface of lung air-vesicles and the glass the density of the capillary network. When a large plastic bag is taken out of the glass, unfolded and cut open, it produces a large area (for instance a bag size 80x80 cm = 6400 cm²) thus demonstrating the large respiration area provided by the lungs.

didactics of biology - human biology - zoology -
respiration - lungs - model - Great Britain.

147311.

301. MATTOCKS, J.C.:

Model vertebrate skeletons

Journal of Biological Education, 17, 1983, No. 2,
pp. 97-98. 2 figs.

The author describes the making of inexpensive models to show the structure of vertebrate skeletons in relation to their locomotion. He describes making

the model of a fish skeleton and that of an amphibian, reptile, bird and mammal. The models are highly functional and make it possible to demonstrate the movement of the animal. They also stress the main differences in the structure and pattern of the spinal column, shoulder and hip bones.

didactics of biology - zoology - vertebrates - skeletons - model - Great Britain. 147311.

302. NEUHAUS, R.:

Funktionsmodell der DNS - von Arbeitsgemeinschaften nachbaubar (A functional model of DNA - made by a pupil hobby club)

Biologie in der Schule, 32, 1983, No. 12, pp.498-499. 7 figs.

In the school year 1981-1982 the biology hobby club of pupils from the 9th and 10th classes of the author's school was given the task of making a functional model of DNA. The author describes in detail how the group proceeded. The model was made of tennis balls (which represent sugars), marbles (which represent phosphorous) and plastic balls (which represent the bases). The model shows the helix form of DNA, the enzymatic breakdown of the double helix, replication and transcription.

didactics of biology - general biology - biology instruction - hobby club - models - DNA - GDR. 147311.

10.7 Two-dimensional representative media

303. Audio-Visual Aids

Teaching Science, 1, 1983, No. 3, p. 97.

Information in the form of a survey on new audio-visual aids available to schools in Great Britain. Among them are 30 wall pictures of mammal skeletons and their dentitions, a picture of a locust, tables with the nutritious values of various foods, slides on the biology of insects, the biology of molluscs and crustaceans, as well as ^anumber of other interesting aids.

didactics of biology - zoology instruction - teaching media - picture - slide - Great Britain. 147311.

304. Audio-visual Materials for Genetics

Journal of Biological Education, 17, 1983, No. 3, pp. 196-198.

A survey of audio-visual teaching media which are available for teaching genetics at various types of school in the United Kingdom. They include recordings, colour films, slides, computer programs, 16 mm films, colour and black-and-white photographs, film cassettes, transparencies and various handbooks for teachers and pupils.

didactics of biology - general biology instruction - genetics - teaching aids - Great Britain. 147311.

10.71 Films (school films, popular science films,
film cassettes, etc.)

305. CARPENTER, G.C. - DUVAL, D.:

Motion Picture and Videotape Analysis of Behaviour
The American Biology Teacher, 45, 1983, No. 6,
pp. 349-354. Lit. 9, 3 figs.

Films and videotapes are very useful for studying the behaviour of various species. A camera is capable of capturing much more than the eye, films can be accelerated or projected in slow motion and make possible thorough analyses and the discovery of basic patterns of human or animal behaviour, the separation and concentration on various behavioural patterns and describing positions taken by various parts of the body, etc. The author describes the outcome of such an analysis concerning an iguana which the human eye could never capture by mere observation. The author also describes how he projected the film on a screen with a network scale on it which made it easier to describe various body movements. Films or video-recordings can also be of benefit in ethological studies and in teaching these disciplines in schools.

didactics of biology - zoology - ethology -
teaching media - films - videotape recordings -
USA. 147311.

306. Československé filmy na přehlídce Schola film '82
(Czechoslovak films at the Schola Film Festival
in 1982)

Učební pomůcky ve škole a osvětě, 22, 1982-1983,
No. 6, pp. 88-89.

At the IIIrd International Festival of School
Films held in Brno, called Schola 1982, the following
biology films produced by the Czechoslovak national
enterprise Komenium were shown: "The Flora and Fauna
of the African Savanah" - script and direction by
S. Studený, consultant Dr. A. Altmann, "Eyesight and
its Defects", script and direction V. Boušek,
consultants: Dr. F. Planerová-Wagnerová and Dr.
J. Jeřábek.

didactics of biology - biology instruction - teaching
media - biology films - festival of school films -
Czechoslovakia. 147311.

307. Doporučení z jednání delegací na III. mezinárodní
přehlídce školních filmů Schola 1982

(Recommendations from a meeting of delegates at
the III. International Festival of School Films
Schola 1982)

Učební pomůcky ve škole a osvětě, 22, 1982-1983,
No. 6, pp. 87-88.

At the IIIrd International Festival of School
Films Schola 1982 the following recommendations
were made by a meeting of delegates: to develop
cooperation and information exchange connected
with the creation and distribution of films, to
lend copies of school films for activational and
study purposes. Cooperation among the socialist

countries should continue, including the co-production of school films and the planning of school films in various countries. Cooperation in the area of videotape recordings should also be extended.

didactics of biology - biology instruction - teaching media - school films - international festival of school films - Czechoslovakia. 147311.

308. KOUBA, L.:

Odborný seminář - Systemové pojetí výzkumu, tvorby a distribuce školních filmů (A specialized seminar on a system approach to the study, creation and distribution of school films)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No. 6, pp. 85-87.

Within the framework of an international festival of school films a seminar was held in Brno which dealt with a system approach to the study, creation and distribution of school films. Among the topics discussed at the seminar were various approaches to school films, the role of script editing and selecting topics for school films; also various opinions concerning the function of school films were confronted. Papers were also presented on the history of school films in this country. The use of various teaching and information media in school teaching were discussed from various aspects, as well as the autoregulation of learning activities by pupils, films as a medium which multiplies the means of expression available in textbooks, various forms of school films and integrated systems of films for various school subjects.

didactics of biology - biology instruction -
teaching media - films - study of films - making
school films - Czechoslovakia. 147311.

309. KREUTER, L.:

Medien in der Drogenprävention. Beispiel Film
und Unterrichtsprogramm (The media in drug addiction
prevention. The example of films and teaching
programs)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 11, pp. 406-410, Lit. 6, 4 surveys of
teaching topics.

Drug abuse is not the consequence of insufficient
knowledge about this subject on the part of young
people, but rather because it is one alternative of
behaviour for young people in a conflict situation.
For instance the film "Helmut, 18 years old - an
alcoholic" and the learning program "Consume cri-
tically" are teaching media which can suitably be
used in topics dealing with a very wide-apread
drug - alcohol. In conclusion the author stresses
the importance of the prevention of drug abuse
and the outlooks for drug addiction prevention in
schools.

didactics of biology - biology instruction - human
biology - films - health-care education - drug
addiction - FRG. 147711.

310. MAHN. F.:

Kazeta pro 16 mm filmovou smyčku (A film cassette with 16 mm film loops)

Učební pomůcky ve škole a osvětě, 22, 1983, No. 1, pp. 11-12. 4 figs.

Film cassettes are very useful for teaching because they provide optimum opportunities for making use of films directly in class. So far schools in Czechoslovakia have only silent film cassettes for KF 8 SUPER projectors available. 8 mm films take 3.5 minutes, i.e. about 13 meters of film. The projection of the cassette can be repeated several times, according to need. But also 16 mm cassettes can be used. They have the advantage of providing a projection to a large screen and better quality images; they also have a sound track. Problems connected with their production have been solved and they are now available in this country and can be used with various projectors which schools have, such as Club 16, Meoclub 16 Automatic, and others. The cassette has a projection time of 5 minutes and has 55 meters of film. The cassettes come with detailed descriptions and instructions for their use.

didactics of biology - 16 mm films - biology instruction - teaching medium - cassette films - Czechoslovakia. 147311.

311. MENZDORF, A.:

Filme zum Thema Aggressionsverhalten (School films on the topic of aggressive behaviour)
Praxis der Naturwissenschaften - Biologie, 12,
1983, No. 8, pp. 251-252.

The author provides information about interesting ethology films concerning human aggressiveness. A brief commentary for teachers accompanies the films, which are recommended for use in teaching human biology.

didactics of biology - biology instruction - human biology - teaching medium - films - ethology - aggressiveness - FRG. 147311.

312. NĚMEČEK, M.:

Přírodopisné filmy na Schola film 1982 (Films on the natural sciences at the Schola film festival 1982)

Přírodní vědy ve škole, 34, 1982-1983, No. 7,
p. 249.

On October 18th to 22nd, 1982 in Brno the IIIrd International Festival of School Films was held. A total of 19 films were shown concerning biology and geology. From Bulgaria the film "Life Under a Microscope" and "Before the Threshold of Maturity" were shown, from Czechoslovakia "The Flora and Fauna of the African Savannah" and "Eyesight and its Defects". From Cuba the films "Movement and Support" and "Iguanas - in Danger of Extinction", as well as "Birth" were shown, from the GDR "The Honey Bee", "Pollination and Fertilization",

"Unicellular Animals", "Digestion in Humans",
"How Lignite Deposits Developed" and "The Creation
of Folded Mountains" and from the USSR "The Adapta-
bility of Organisms", "The Criteria and Structure
of the Species" and "Man and Nature".

didactics of biology - biology instruction -
teaching media - films - festival of school films -
Czechoslovakia - 147311.

313. Nový sborník statí o školním filmu v ČSR

(A new collection of papers about films in school
in the Czech Socialist Republic)

Učební pomůcky ve škole a osvětě, 22, 1982-1983,
No. 9, pp. 141-142.

The new collection of papers on school films
in the Czech Socialist Republic contains an intro-
ductory paper by J. Novotný "The Beginnings of
Czech School Films" and papers by R. Hošek on the
characteristics of Czech school films and their
creators, by E. Sládek about the concept of using
school films in expository teaching methods, and
by J. Fiala about the didactical value of school
films in specialized teaching subjects. The Mi-
nistry of Education has approved this collection
of papers as a methodological handbook for basic
and secondary schools.

didactics of biology - biology instruction -
teaching medium - films - collection of papers -
school films - Czechoslovakia. 147311.

314. PRESMAN, L.N.:

Metodologický přístup k tvorbě a využívání školních filmů na středních školách v SSSR (Methodological approaches to the creation and use of school films in secondary schools in the USSR)

Učební pomůcky ve škole a osvětě, 22, 1983, No. 7, pp. 109-111.

Methodological approaches to the creation and use of films in secondary schools in the USSR are described, beginning with the selection of a topic, seeking the relevant information, preparing a script and the accompanying text, the work of the director, designers, editors, the seeking of new means of expression and various types of films from the point of view of their use in the teaching process (films which sum up and provide opportunities for the repetition of what has been learnt, for the explanation of new material, documentary films, etc.). The author also discusses the educational impact of school films.

didactics of biology - biology instruction -
teaching media - school films - production of
school films - USSR. 147311.

315. SCHMIDT, H. - BARTH, H.:

Neues aus dem FWU. Die Schleiereule (Tyto alba)
323451 (16 mm Lichten Farbfilm, 19 Minuten).
(New films form FWU. The Barn owl (Tyto alba)
323451 - a 16 mm colour film with sound track -
19 minutes playing time)
Naturwissenschaft im Unterricht - Biologie, 31,
1983, No. 10, pp. 359-361.

This new film about the Barn owl is for basic schools and the lower classes of secondary schools, as well as for nature conservation groups. This bird is seriously threatened with extinction. Owls, as well as birds of prey, are at the top of food pyramids and from the bodies of their prey (mostly small rodents) they intake all dangerous substances used in agriculture, such as herbicides, pesticides, insecticide. H. Barth also provides interesting information about the making of the film.

didactics of biology - biology instruction -
teaching media - films - nature conservation -
owls _ FRG. 147311.

315. SLÁDEK, E.:

Oceněné školní filmy (School films which have
recieved awards)
Učební pomůcky ve škole a osvětě, 22, 1983, No. 6,
pp. 83. 2 photos.

At the 3rd International Festival of School Films of the socialist countries held in Brno this year, competitions were held in the categories of films dealing with the natural sciences, the social

sciences, specialized films and educational films. A total of 64 films from Bulgaria, Cuba, Hungary, the GDR, Poland, the USSR and Czechoslovakia were entered into the competitions. First prize in the category of nature films was given to a Cuban film by director M.A. Cas called "Birth". Honorary mention in the category of nature films was given to a film from the GDR by directors K.H. Gehkar and G. Heichel called "The Honey Bee". Among the group of films made in Czechoslovakia, a Golden Plate was given to a film on the flora and fauna of the African savannah.

didactics of biology - biology instruction -
teaching medium - film festival - school films -
Czechoslovakia. 147311.

317. TREVIŠOVSKÝ, V.:

Od ústrednej požičovne Školfilmu po filmoteku na školách. Vývoj snáh o priblíženie školského filmu školám (From a centralized lending service of school films to film libraries in schools. The development of strivings to bring school films closer to schools)

Učební pomůcky ve škole a osvětě, 22, 1983, No.1, pp. 13-14.

The author describes the history of using films in Slovak schools, until the present when many schools have their own collections of films. Since the first years of the existence of the Institute for School and Educational Films in Bratislava, school teachers have been demanding that they be able to show a film to their pupils whenever they

consider it proper, throughout the school year. During World War II, the firm Zeiss delivered only 245 of a total of 3 300 film projectors which had been ordered. At that time Slovak schools only had a total of 300 film projectors. However, the situation in lending films was even worse: the lending service only had 85 films in 750 copies. Approximately 60 % of all communities in Slovakia did not have electrical energy. In 1942 a mobile film service was established which had two Fiat-Topolino cars equipped with sound equipment and a portable electrical energy aggregate. In 1946-1949 approximately 100 schools were equipped with film projectors and the number of films available was increased to 421 films in 4200 copies. In 1955 The Central Institute for the Further Education of Teachers was founded, which in 1957 divided all the available films to regional institutes. By 1964, 20 500 copies of films had been distributed to schools. Regional lending services and district lending services were established. By 1968 Slovakia already had 33 district and regional film lending services which owned 30 654 copies of films.

didactics of biology - biology instruction - teaching media - films - history - school films - Slovakia - Czechoslovakia. 147311.

318. GREBEŇ, G.A.:

Plan televizionnykh peredach po biologii na 1983-1984 uchebnyy god (A plan of television broadcasts related to biology in the school year 1983-1984)
Biologiya v shkole, 57, 1983, No. 5, pp. 56-57.

In the school year 1983-1984 television broadcasts on botany (for the 5th and 6th grades), zoology (for the 6th grade) and general biology (for the 9th and 10th grades) will be broadcast. A total of 15 programs relate to botany, 14 to zoology and 21 to general biology.

didactics of biology - biology instruction - teaching media - television - biology programs - USSR.
147311.

319. NOVÁČEK, F.:

Využití televizního přenosu ve výuce botaniky
(The utilization of television broadcasts in botany teaching)
Přírodní vědy ve škole, 34, 1982-1983, No. 10,
p. 368. 1 fig.

The author provides information on the introduction of new equipment at the Palacký University in Olomouc which makes it possible to directly broadcast microscopical images of plant structure. The equipment was developed by the departments of botany and the didactics of biology, in cooperation with the Centre for Teaching Technology at this faculty. The equipment is composed of a ETS 5 400

television camera, a ETS 9 200 television monitor, a microscope and an illumination source. The total value of the equipment is only 30 000 Czech Crowns. It can be used in teaching, in scientific work, during seminars and lectures and in practical exercises on botanical problems, when examining students and whenever the anatomy and cytology of plants is taught.

didactics of biology - biology instruction - botany - teaching technology - teaching media - television - microscope - Czechoslovakia. 147311.

320. SCHUBERT, F.:

Hinweise zur Unterrichtssendung des Fernsehens (USF)
"Merkmale einer Pflanzenfamilie" (References to a school television program "The Characteristics of Plant Families")

Biologie in der Schule, 32, 1983, No. 4, p. 165.

This program is for use in the 5th class. It includes the following topics: the structure of blooms, the pea family of plants, fruits and seeds, tumors on roots, specie variety. The purpose of the programs is to provide new knowledge. The author provides various methodological instructions on the teaching of these topics and discusses the inclusion of a TV broadcast into a school lesson.

didactics of biology - biology instruction - botany - pea plants - television - GDR. 147311.

321. SCHUBERT, F.:

Die Nutzung der Fernsehsendung "Über das Verhalten von Vögeln" zur Leistungskontrolle - Beschreibung eines Versuches

(On utilizing the television program "On bird breeding" as a means of assessing pupils' learning - report on an experiment)

Biologie in der Schule, 32, 1983, No. 11, pp. 448-449.

There are many ways of utilizing TV programs in the course of teaching. Their use in examinations and in verifying pupils' knowledge is also an often discussed method of using TV programs. The author describes an experiment in which he used a total of 14 installments of a television series broadcast between December 1981 and January 1982 for this purpose; he cites various questions used in conjunction with the program and the results achieved.

didactics of biology - biology instruction - teaching media - television - zoology - ethology - birds - FRG. 147311.

322. SCHUBERT, F.:

Schulfernsehen und Schulfunk im Schuljahr 1983-1984.

(School television and school radio broadcasts in the school year 1982-1983)

Biologie in der Schule, 32, 1982,

School television programs are extensively viewed, for instance in the 9th class 75 % of classes and in the 10th class 65 % of classes listen and look. The author provides a detailed survey of programs for the 5th, 9th and 10th classes, including their duration and the subject-matter they cover. Also a brief survey of 6 radio programs planned for the school year 1983-1984 is provided.

didactics of biology - biology instruction -
teaching medium - television - GDR. 147311.

323. TARUSOVA, T.M.:

Kratkie annotatsii televizionnykh peredach po
botanike i zoologii na I polugodie 1983-1984
uchebnogo goda (Brief annotations about television
programs on botany in the first term of the 1983-
-1984 school year)

Biologiya v shkole, 57, 1983, No. 5, pp. 57-59.

The article provides descriptions of planned television programs, which include 8 on botany and 6 on zoology. Each annotation includes the date of broadcast, the subject matter it will deal with and various recommendations for the teacher for preparing the lesson in which the program will be shown to pupils.

didactics of biology - biology instruction - botany -
zoology - teaching media - television - USSR. 147311.

10.73 Pictures

324. DUFKE, F.:

Práce s obrazem na 1. stupni základní školy
(Using pictures in teaching in the elementary
classes of primary school)
Učební pomůcky ve škole a osvětě, 22, 1982-1983.
No. 10, pp. 148-149.

An article by a teacher describing his own experiences with the use of pictures in teaching

young children in the elementary classes of primary school. After original objects, pictures are the most frequently used and didactically most valuable instruction media in basic schools. Especially when they are used immediately after direct observations, pictures can stress what pupils could hardly have noticed or would have difficulty in remembering. Pictures can also contain developmental aspects, as well as ecological references. Pictures facilitate the making of comparisons and the forming of notions. In conclusion the author offers various didactical recommendations on the use of pictures.

didactics of biology - biology instruction -
teaching media - pictures - Czechoslovakia. 147311.

10.733 Foils and transparencies

325. JENSEN, L.A.:

Transparency Master: General Tapeworm Structure
The American Biology Teacher, 45, 1983, No. 2,
pp. 100-101. 7 figs., lit. 2.

The author describes a transparency master for use in zoology classes which concerns tapeworms (Cestoides). 6 pictures can be used with the transparency to show various structural aspect of this animal.

didactics of biology - zoology instruction -
parasites - tapeworms - teaching media - transpa-
rency - USA. 147311.

10.75 Slides and slide series, projected micro-
scopic specimens

326. L.K.:

Soutěžní přehlídka diafonů "Na ochranu přírody"

(A competition of slide series with taped commentaries on the subject-matter of nature conservation)
Učební pomůcky ve škole a osvětě, 22, 1983, No. 9,
pp. 140-141.

On November 24th to 26th a state-wide competition of slide series accompanied by taped commentaries pertaining to the subject-matter of nature conservation was held in Prague at the occasion of the 10th anniversary of the Stockholm UNO conference on the environment. The competition was organized by the State Institute for the Conservation of Historical Monuments and Environmental Conservation and the Observatory and Planetarium of the City of Prague. At this occasion also a seminar was held on the making and utilization of slides in education towards nature conservation and environmental control. The first prize was awarded to a slide series called "A Place in the Sun", 2nd prize to a series called "The Treasure of Snake Cliffs" and 3rd prize to a series on "Nature in Prague 10 and its Conservation".

didactics of biology - biology instruction -
teaching media - slide series - nature conservation -
Czechoslovakia. 147311.

10.76 Sketches, flora diagrams and formula

327. EGERSDORFF, S.:

The Use of Mobiles in Biological Classification
The School Science Review, 64, 1983, No. 229.
pp. 701-702.

Movable lables can serve as a visual stimulus for the classification of biological objects. The author describes how he moves these various coloured lables about with the aid of coat hangers and nylon threads. In this way various relations within the framework of flora or fauna classification can be demonstrated.

didactics of biology - biology instruction - lables - systematics - flora - fauna - classification - Great Britain. 147311.

328. MOREL, J.C. - ULYSSE, J.:

Les "finches vertes" (Green cards)
Biologie, Géologie, 70, 1983, No. 2, pp. 359-372.

The "green cards" mentioned in the title represent an integrated source of biological documentation for teachers and their pupils. Each card contains a simple drawing of the animal in question, and information on its size and how it can be identified and classified, as well as data on its environment, its enemies, whom it is hunted by, the animal's respiration, how it reproduces, its other specific aspects and relation towards man. Some of the tables are mainly for pupils, who use them while working in small groups, while others

are used mainly by teachers as a source of brief basic data on the basis of which they can prepare their lesson. Their name is derived from the fact that they have a green border. Beginning with the year 1983 the journal will publish 5 or 6 of these cards in each issue.

didactics of biology - biology instruction -
teaching media - summary cards - France. 147311.

329. TRANTER, J.:

The Use of Mobiles in Aspects of Teaching Ecology
Journal of Biological Education, 17, 1983, No. 1,
pp. 8-10. 2 figs., 1 sketch

The use of mobile illustrations is very suitable for ecology teaching; they help especially less bright students to understand this complex subject matter. The Centre for Life Studies has published page-size cards containing pictures of for instance fresh water animals, which can then be cut out and used to illustrate a food chain in a specific type of environment. Besides food chains, also food networks can be shown containing for instance representatives of phytoplankton, the raach, Daphnia magna, copepods, the stickelback, perch and pike. Producers, consumers of the 1st and 2nd degree and predators all together contribute to an ecological pyramid.

didactics of biology - biology instruction - ecology -
food chains - food networks - food pyramids - Great
Britain. 147311.

330. TRATCZAK, J..

Technika, metodyka projekcji cienowej (The technique and methodology of shadow projection)

Biologia w szkole, 36, 1983, No. 2, pp. 119-121.

7 figs.

The author suggests using various pictures showing the outlines of animals or plants and to project them directly on to a screen. Also symbols can be projected (for instance the division of enzymes into substance S_1 and S_2), which can either be labelled or without labelling so that pupils must fill in designations. Also leaves with stomata can be projected, the joint articulation of bones or maps for zoogeography, etc. The objects projected should be between 10 to 250 mm in size and the source of light must be sufficiently strong.

didactics of biology - biology instruction -
teaching medium - drawing - projection - Poland.
147311.

10.82 School bulletin boards, clippings from the press and periodicals

331. FLANNERY, M.C.:

The Importance of Trivia

The American Biology Teacher, 45, 1983, No. 2,
pp. 105-108.

The author discusses the use of various trivial news items from the press in biology teaching; they

are usually popular among students and at the same time a discussion about them can be illuminating. As an example the author cites a news item about a baby born with a tail. Its structure was not, however, vertebral, but was made of fibrous and fatty tissue. It can serve as proof of Haeckel's law of ontogeny, which repeats phylogeny. Another news item concerned a poisonous fish found near Japan, which the Japanese consider to be delicacy, but there is a law against serving it in restaurants because it could lead to serious poisoning. Another interesting fact concerns bacteria which concentrate silver on their surface in the form of silver sulphate, in spite of the fact that for the majority of bacteria silver is a poisonous substance. Botulin, a poison created by bacteria, when used in extremely small quantities can serve as treatment for some types of squinting. Also interesting items concerning mathematics and statistics are cited.

didactics of biology - biology instruction -
teaching media- press clippings - discussions -
USA - 147311.

10.83 Textbooks, methodological handbooks

332. POLYANSKIY, Y.I.:

O 14m izdanii uchebnika "Obshchaya biologiya"

(On the 14th edition of the textbook "General Biology").

Biologiya v shkole, 57, 1983, No. 4, pp. 57-59.
Lit. 2.

This textbook on general biology for pupils of the 9th and 10th classes has been in use since 1966. The author of this article, who is the head of a team of authors, here carries out an analysis of the most recent 14th edition. He comes to the conclusion that this edition is in accordance with contemporary requirements in biology teaching and the conclusions of the 26th Congress of the Communist Party of the Soviet Union. Previous editions typically were descriptive, which was attractive to pupils with a good memory. The changes which have been introduced represent some difficulties for pupils, but are in agreement with the level of knowledge achieved in the biological sciences. It is up to teachers to find ways of instruction which will enable pupils to learn in accord with the program of the improved educational and teaching system. The main outline of the textbook has been maintained: In the 9th class pupils learn evolution theory and generalize the knowledge they have gained in lower classes. In the 10th class pupils learn basic laws of biology. The author describes in detail the changes which have been incorporated into this 14th edition. In conclusion

the importance of biological education is stressed.
didactics of biology - biology instruction - general biology - 9th and 10th class - textbook - USSR. 147311.

10.84 Teaching syllabi

333. KAUFMANN, M.:

Ein Taschenrechnerprogramm zur qualitativen Erfassung der Selektion gegen dominante oder rezessive Allele (Minicalculator programs for the quantitative understanding of selection based on dominant or recessive alleles)
Praxis der Naturwissenschaften, 32, 1983, No. 2, pp. 56-61.

The author describes a learning program in genetics where selection based on recessive and dominant signs is studied according to the Hardy-Weinberger law of allele frequency in a population. The program is intended for a Texas Instruments 58 (C) or 59 calculator. The author also discusses other uses for a minicomputer in biology instruction.
didactics of biology - biology instruction - genetics - general biology - learning program - FRG. 147311.

334. KOUBA, L.:

Perspektivy uplatnění zpětnovazebních komunika-
tivních vztahů v současné škole (The outlooks
for the implementation of feedback communicative
relations in contemporary school)

Učební pomůcky ve škole a osvětě, 22, 1983, No. 8,
p. 115.

Socialist schools should use progressive elements of program teaching, develop them further and implement their optimum influence upon both teachers and pupils. Throughout the world a change is taking place from individual educational programming towards frontal or group programming in connection with complex computer systems, but the teacher in the teaching process should not be overlooked. Research into programming and feedback communicative systems in Czechoslovakia are continuing; already 400 basic and 150 secondary schools use some kind of feedback teaching system (KE, MODIFIKA, PREMIANT and MAGNOCORX). Printed, audiovisual and audiooral programs are available for these machines. So far the findings of the research project on this subject are positive and confirm the usefulness of feedback systems in modern socialist schools.

didactics of biology - biology instruction -
teaching program - computer - Czechoslovakia.
147311.

335. SLIVKO, J.:

Materiálna základňa vyučovania na Základnej škole
v Spišskej Novej Vsi na ul. ing. Kožucha II.

(The material basis for teaching in the Basic School at Ing. Kožuch street in Spišská Nová Ves)
Učební pomůcky ve škole.a osvětě, 22, 1983, No. 8,
pp. 116-118. 1 fig.

On the basis of experience with testing the first feedback system based on the use of a PREMIANT type machine(at the school in Mýtočovice, the Gottwaldov district, B. Halouska - principal) the teachers at the basic school in Spišská Nová Ves designed and made a new type of desk for pupils on which the feedback machine can be mounted. The control panel is connected with a tape recorder and has a remote control switch of the MEOCLUB AUTOMATIC H machine, a ASPECTOMAT J 24 B slide projector, which also contains a switch to control the ELEKTROSTABIL projection screen; also a wireless earphone system can be introduced. This system makes it possible to activate all pupils in the class, the processing of a large number of answers both by groups or individuals, and to carry on a large-scale dialogue between the teacher and the pupils, as well as the possibility of adapting the teaching process according to need and the possibility of the teacher obtaining information about how each pupil is continuing. The article contains a drawing of the installation of this system in a class. Pupils have a KE 3 machine which is run by a 4.5 V flat battery. There are now 29 programs on mathematics, physics, chemistry and nature studies available.

didactics of biology - biology instruction -
learning program - didactical technology - Czecho-
slovakia. 147311.

10.85 Worksheets, workbooks, didactical tests,
questionnaires, didactical cross-word
puzzles, didactical games, etc.

336. BROGMUS, H. - DIRCKSEN, R.:
Arbeitsblätter zum Thema Die Natur im Wechsel der
Jahreszeiten (2) (Worksheets on the topic Nature
and changes in the seasons (2)).
Naturwissenschaften im Unterricht, 31, 1983,
No. 7, pp. 227-230. 1 worksheet.

The article describes the ethology of the blackbird and its behaviour during the nesting period. This bird is highly suitable for observations by pupils in view of the fact that it is so wide spread and can be observed outdoors. This worksheet is suitable for the 4th to 6th class, but can also be used in the 7th or 9th classes. The article contains a worksheet for pupils and also a large amount of factual information on this interesting bird.

didactics of biology - zoology instruction -
ethology - birds - FRG. 147311.

337. BROGMUS, H. - DIRCKSEN, R.:

Arbeitsblätter zum Thema Die Natur im Wechsel der Jahreszeiten (1) (Worksheets on the topic Nature and changes in the seasons (1)).

Naturwissenschaften im Unterricht, 31, 1983, No. 4, pp. 137-143. Lit. 5, 1 worksheet, 3 models for transparencies.

The author here describes early blooming plants in gardens, parks and forests for the 7th to 9th classes, in the context of the topic of a mixed beech forest. The main part of the article is a description of the relevant plants, their ecology and their nature conservation aspects. Among the plants dealt with in detail are the squill, anemone, tulip, primula, daffodil, saffron, oxalis, snow-drop, violet and others. Their biology is described from December until November and the abiotic factors ^{in the} environment are described, especially the influence of light at the grass level.

didactics of biology, biology instruction, botany, ecology - FRG. 147311.

338. BROGMUS, H. - DIRCKSEN, R.:

Arbeitsblätter zum Thema Die Natur im Wechsel der Jahreszeiten (Worksheets on the topic Nature and changes of the seasons)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 10, pp. 335-338. Lit. 11, 4 figs., 1 worksheet.

The authors here deal with various topics for the 5th and 6th classes, as well as for the 7th and

8th classes, which deal with food networks, hunting for prey, reproduction, care of progeny and the ecological status of the Diadem spider. The pictures and worksheet also pertain to these problems. The article contains a great deal of information, methodological instructions for teaching and outlines for independent pupil projects. The authors describe the behaviour and instincts of the whole Araneidae family (which includes 2 500 species) and 49 species native to the Federal Republic.

didactics of biology, zoology - instruction -
Araneidae, - ethology - FRG. 147311.

339. BROGMUS, H. - DIRCKSEN, R.:

Arbeitsblätter zum Thema Die Natur im Wechsel der Jahreszeiten. Verbreitung von Samen und Früchten
(Worksheets on the topic Nature and changes of the seasons. Project on seeds and fruits)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 10, pp. 338-343. Lit. 9, 1 worksheet,
2 figs.

The subject of this article is the dispersal of seeds and fruits of plants and is for the 5th and 6th classes (seeds and fruit, the dispersal of seeds for maintaining the specie, etc.) and for the 7th and 8th classes (structure and functions of mechanisms for the dispersal of seeds and fruits). The adaptation of these mechanisms to a specific ecological situation, to biotic and abiotic factors is stressed. The authors explain zoochores, autochores, anemochores and anthropochores and cite specific examples for each type.

didactics of biology - biology instruction - botany -
fruit - seeds - dispersal of seeds - FRG. 147311.

340. ČERNÝ, V.:

Odpovedové karty (Answering cards)

Učební pomůcky ve škole a osvětě, 22, 1982-1983,
No. 2, pp. 25-26.

The author provides suggestions for increasing the effectiveness of the teaching process, so that the mediation of information to pupils is based on feedback (teacher - pupil - subject-matter). One form of achieving this end is the use of answering cards during specially created problem situations where multiple choice answers can be used, which are projected on an overhead projector. The answering cards have different colours and are selected by pupils according to what they think is the correct answer. The teacher can easily see the number of pupils who have provided the correct answer and how many have understood his explanations. The teacher can then adjust the lesson according to how the pupils are progressing. Experiments carried out with these cards in two classes have shown them to be highly effective. This method can be used in various classes and in various subjects.

didactics of biology - biology instruction - feed-
back - answering cards - Czechoslovakia. 147311.

341. KOT, W.:

Testy w nauczaniu biologii w amerykańskiej szkole średniej (The use of tests in biology teaching in American secondary schools)
Biologia w szkole, 36, 1983, No. 1, pp. 46-53,
2 figs.

Schools in the USA use tests very extensively in all teaching subjects; they serve to determine the knowledge, skills and habits acquired by students. But too extensive use of tests can have a negative effect on instruction. For this reason educational journals in the US have increasingly been writing about this problem and there have been a number of articles against tests. The author discusses at length biology tests, for instance the Regent High School Examination. These tests contain a number of tasks in biology (about 120) which the student works over in the course of three hours. The outcome provides the teacher with a clear idea of what the student has learnt during the year. The author selected fifty questions from these tests and used them in Polish schools with very good results.

didactics of biology - biology instruction -
teaching media - tests - Poland. 147311.

342. MORGAN, L.A.:

Integrated Biology - A Game

The School Science Review, 65, 1983, No. 231,
pp. 294-297. 2 figs.

This educational game integrates knowledge in five areas of biology and concerns the chemistry of life, protein synthesis, cellular ultrastructures, genetics and evolution. The game can also be extended to other areas of biology. Players obtain cards with key words, dice are thrown and the player who is the first to find a word related to the key word receives a point. The player who first receives three points, wins.

didactics of biology - biology instruction -
teaching media - didactical game - Great Britain.
147311.

343. POSPÍCHALOVÁ, R.:

Využití křížovek a tajničky ve výuce přírodopisu na ZŠ (Crossword puzzles in teaching the natural sciences in basic schools)

Přírodní vědy ve škole, 34, 1982-1983, No. 3,
pp. 88-89. 3 crossword puzzles.

The author informs readers about her own experiences with the restructuralization of teaching according to a new model, with new textbooks and new teaching syllabi. The author also describes her experiences with using crossword puzzles in lessons, which are done by individual pupils or by groups of pupils. The three crossword puzzles attached to the article demonstrate how they can

be interesting for pupils, while at the same time strengthening what has been learnt and contributing to the clarification of some notions.

didactics of biology - biology instruction -
teaching medium - didactical games - crossword
puzzles - Czechoslovakia. 147311.

344. SCHUSTER, H.:

Das Projekt "Umweltspiel" (The project "an environmental game")

Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 1, pp. 14-28, 6 tables, 4 tables for dice,
1 dice.

This game was made by the author, a biology teacher, in cooperation with the drawing teacher at his school. The game is for the first class of general education secondary schools and serves both biology and drawing classes. The game concerns various aspects of ecology, nature conservation and environmental control. The game includes 28 playing cards with texts, special dice and instructions for playing the game. It received 1st prize and a 3000 shilling reward at a competition held at World Youth Day held in Salzburg.

didactics of biology - biology instruction - nature
conservation - environmental control - interdis-
ciplinary relations - drawing - didactical game -
FRG. 147311.

345. SCHWARZ, A.:

Rätsel für Klasse 6 (A riddle for the 6th class)
Biologie in der Schule, 32, 1983, No. 11,
pp. 446-447. 1 fig.

The author describes a riddle, which she has been using successfully for a number of years in biology teaching. It serves above all for the strengthening and repetition of what has been learnt. The riddle has the shape of a crossword puzzle and concerns the family Pinaceae.

didactics of biology - biology instruction - botany - didactical game - GDR. 147311.

346. STRICK, K.:

Einführung und Anwendung des Chiquadrat Tests im Biologieunterricht der Sekundarstufe II. test
(The introduction and use of the Chi square in biology teaching in the upper classes of secondary school)
Der mathematische und naturwissenschaftliche Unterricht, 36, 1983, No. 1, pp. 36-37. Lit. 5, 1 fig.
4 tabs.

The author demonstrates the use of the Chi square test in biology instruction in the upper classes of secondary school. He demonstrates its use on the Mendelian law of heredity, specifically the segregation of signs in the F_2 generation both in the case of a dominant and recessive signs or when both signs are dominant, i.e. in the segregation 3:1 and 1:2:1. The example assumes 60 individuals. The experiment uses data for multi-hybrid intermedial heredity and dihybrid heredity. The notion of expected values is introduced for mono-

hybrid heredity. These calculations can be done without learning probability calculus. The size of X^2 determines deviations from expected values. Values of X^2 which are higher than critical values are rare, those which are not higher are acceptable for the formulation of a hypothesis.

didactics of biology - biology instruction -
genetics - upper classes - secondary school -
tests - FRG. 147311.

347. ŠVEC, V.:

Pracovní sešit v teoretické a praktické výuce
(Workbooks in theoretical and practical teaching)
Učební pomůcky ve škole a osvětě, 22, 1982-1983,
No. 4, pp. 52-53.

Workbooks for some subjects exist for the lower classes of basic schools, but in the upper classes of basic school or in secondary schools teachers usually have to make their own workbooks. The author here describes the use of workbooks in the course of military service training of graduates of secondary schools or apprentice training centres. A workbook is a material didactical medium which combines the purpose of the pupil's notes with the advantages of a textbook. A workbook thus guides the psychomotor activities of the pupil in various stages of the educational and teaching process. Such workbooks are called complex workbooks and serve the study of the teaching subject as a whole. Workbooks havegnoseological, psychological, didactical and educational functions. In theoretical instruction they contributes to the development of the pupil's intellect abilities and

the easier learning of knowledge, skills and habits,
as well as independent learning for examinations
and carrying out various projects.

didactics of biology - biology instruction -
teaching media - workbooks - Czechoslovakia.
147311.

10.86 Atlases, keys and punch cards to identify
natural objects

348. HESSE, G.:

Tabelle zur Bestimmung der in Deutschland vor-
kommenden Spinnenfamilien (A table for identifying
species of the spider family living in Germany)
Der Biologieunterricht, 19, 1983, No. 4, pp. 88-93.

The article comments a table for identifying
the spider family, i.e. the species found in Germany.
The table has 28 pictures to make identification
easier. This article is a supplement to an article
published in issue No. 1, 1983 of this journal in
1983 by the same author, called Biologie - Exkur-
sion eines Leistungskurses auf die Mittelmeerinsel
Elba.

didactics of biology - biology instruction - ex-
cursion - teaching media - determination key -
spiders - FRG. 147311.

349. ELLIOT, M.:

A Key for British Slugs with an Outline of their Ecology

Teaching Science, 1, 1983, No. 2, pp. 46-54, Lit.15, 9 figs.

This key deals with the phylum Mollusca, class Gastropoda, subclass Pulmonata, order Stylommatophora and 4 families of this order: Testacellidae, Arionidae, Limacidae and Milacidae. The key includes 23 species and describes microclimate factors, food, reproduction and growth, breeding and their environmental niche.

didactics of biology - zoology instruction -
teaching media - determination key - molluscs -
Great Britain. 147311.

10.87 Basic scientific literature, literature concerning the didactics of biology

350. SHAW, G.W.:

A reading list for S-level biology - Part XV.

The School Science Review, 64, 1983, No. 229, pp. 702-711.

The author provides a list of articles on biology published in various journals, including the Journal of Biological Education, The New Scientist, The School Science Review, The Scientific American and others. The articles are divided according to various topics.

didactics of biology - teaching media - literature.
147311.

351. GULLIVER, R.:

Natural History Articles in 1982

Teaching Science, 1, 1983, No. 3, p. 92.

The author cites a list of articles found in journals and magazines which concern biology and will interest the biology teacher. He specifically deals with the following journals: Country Life, Countryman, Country Quest, Countryside Monthly, The Field, Geographical Magazine, The New Scientist, Natural Science in the Schools, Wildlife. The articles are classified according to their topic.

didactics of biology - teaching media - literature -
journals - Great Britain. 147311.

10.88 Popular science literature and periodicals

352. KOROLEVA, N.V.:

V vykhodu v svet novogo uchebnogo posobiya "Biologiya - Spravochnye materialy. Kniga dlya uchashchikhsya" (At the occasion of the publication of a new teaching aid - "A biology handbook for pupils")
Biologiya v shkole, 27, 1983, No. 6, pp. 68-69.

The Prosveshchenie Publishing Company is beginning to publish teaching aids of a new type - handbooks for pupils which contain in a condensed form and in a highly accessible manner the subject-matter of a subject taught in all classes. The

books are meant to be a source book for pupils when they work on independent projects and in some cases they replace textbooks, which must be returned at the end of the school year, while the handbooks can be kept for the whole duration of studying biology. The new handbook is five times smaller than the sum of the relevant textbooks. The author describes in detail the structure and content of the handbook, which is composed of four sections - on botany, zoology, human anatomy, physiology and hygiene and finally on general biology. Each part is written in a deductive manner.

didactics of biology - teaching media - handbook +
biology - popular science literature - USSR. 147311

10.89 Pupils' notes

353. HANF, R.:

Zur Führung von Mark- und Übungsheften (On notebooks for taking notes and doing exercises)
Biologie in der Schule, 32, 1983, No. 1, p. 34.

The author reacts to an article published in issue No. 9 of this journal in 1981. According to her experiences a division of teaching subject-matter according to the decimal classification system has proven to be very useful and hence she does not agree with the opinion cited in the mentioned article. She also favours using rubber stamps, but underlining according to specific criteria is

considered to be too dogmatic. Giving pupils marks for the quality of their notebooks is considered to be debatable.

didactics of biology - teaching media - notebooks - USSR. 147311.

354. SEHMRAU, W.:

Merk- und Übungshefte - Führung, Kontrolle, Bewertung
(Notebooks and exercise books - their supervision, control and assessment)

Biologie in der Schule, 32, 1983, No. 12, pp. 493-495.

The discussions which have taken place concerning notebooks and exercise books have not taken sufficiently into account that they serve to develop pupils' abilities for graphic representation and it is this aspect which should be stressed. For this reason control and assessment should be undertaken regularly and in a responsible manner. Occasional controls are insufficient. The author expresses polemical opinions on some of the articles published on this subject recently.

didactics of biology - biology instruction - teaching media - notebooks - GDR. 147311.

10.92 Instruments and aids for experiments with
natural objects

355. AUSTIN, J.:

A Simlified and Inexpensive Method for Measuring
Dissolved Oxygen in Water

Journal of Biological Education, 17, 1983, No. 3,
pp. 187-188. Lit. 6.

The author describes a modification of the Winkler method which does not require the use of a starch indicator or burette. The method for determining the amount of dissolved oxygen in water is simple and inexpensive and can be used in the field or laboratory when studying a water environment and water eco-systems, as well as biochemical demands for oxygen by various organisms.

didactics of biology - biology instruction - laboratory work - field work - eco-systems - oxygen + water - Great Britain - 147311.

356. LOCK, R. - WOOD-ROBINSON, C.:

Equipment for Recording Human Breathing

Journal of Biological Education, 17, 1983, No. 2,
pp. 86. Lit. 2, 6 figs., 1 tab.

The authors describe various means for recording and observing human respiration, made by various firms. They also describe the experience of 60 teachers whom they asked for their opinions on this subject. A spirometer and stethoscope are

described, as well as more complicated instruments.

didactics of biology - biology instruction - human
biology - respiration - teaching media - instruments -
Great Britain. 147311.

357. MORRIS, J.C.T.:

A Simple Automatic Volumetric Spore Trap for
Monitoring Air Spora

The School Science Review, 64, 1983, No. 228,
pp. 500-505, Lit. 10, 5 figs.

The article contains a drawing of this automatic spore trap, so that it can be made by the teacher. The atmosphere has numerous microorganisms suspended in it. They include the spores of fungi, pollen grains, bacteria, protozoa and algae. The trap described by the author sucks in air, filters it and captures the spores. Pictures provided by the author make it possible to roughly identify the spores and classify them. Samples differ according to the time when they are obtained; their composition is influenced by the weather, the season, local vegetation (especially pollen) and a daily rhythm. The influence of man is also apparent in spore samples (when grass is being mowed, the proximity of urban industry, etc.).

didactics of biology - environmental control -
microorganisms + air - instrument - field work -
Great Britain. 147311.

358. ROBBINS, M.:

A Water Pooter

Journal of Biological Education, 17, 1983, No. 2,
p. 87. 1 fig.

The author describes the making of a simple and inexpensive water pooter for collecting water insects and other small invertebrates living in the water. This model works without touching and thus swirling the bottom. The most important part of the pooter is a glass vessel with two tubes, two plugs and two thin plastic pipettes. Essentially the water pooter works like a pooter for the collection of insects.

didactics of biology - zoology - collection + water
insects -instrument - field work - Great Britain.
147311.

359. SURTEES, M.J.:

More Pooters. A Safer Pooter

Journal of Biological Education, 17, 1983, No. 2,
p. 87. 1 fig.

The author recommends the use of a simple and safe pooter for the collection of insects. The model he recommends is made plastic, since glass can be dangerous in field work, where it can easily break.

didactics of biology - biology instruction -
entomology - field work - collection - Great
Britain. 147311.

10.95 Instruments for creating images and reproducing sound, film projectors, episcopes, epidiascopes, slide projectors, overhead projectors, tape recorders and decks, radio sets, phonographs, radio-phonographs, combined projection facilities, control panels

360. KOPECKÝ, M.:

Šetříme projekční žárovky (Economizing on bulbs in film projectors)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No. 4, pp. 63-64.

Projection bulbs are expensive and very fragile. Their life span should be extended. The main principles for the economical use of these bulbs can be summed up by the following: sufficient cooling, improving cooling methods, correct handling, correct insertion, getting rid of any mechanical vibrations or shocks, sufficient cooling after use, correct switching on and off of the projector, correct setting of optical systems, adherence to all safety rules. The main cause of burning out the bulb filament is the expiration of shelf life of the bulb, poor material, overheating of the bulb, ^{due}to faulty use, vibrations of projector and especially insufficient cooling.

didactics of biology - teaching media - projections - Czechoslovakia. 147311.

361. Resources: Addresses of Audio-visual Aids Suppliers
Journal of biological Education, 17, 1983, No. 2,
pp. 112-118.

The centre for science and mathematics education at Chelsea College in London here provides the names and addresses of 185 suppliers of audio-visual media for schools in the United Kingdom. The list includes the suppliers of models, pictures, 35 mm films, aerial photographs, teaching media on the environment and nature conservation, taxidermic specimens, films, video tapes, maps, writing projectors, transparencies, slides, teaching programs for BBC broadcasts, nutrition tables, biological games, ecological films, film cassettes, video cassettes, identification keys, etc.

didactics of biology - teaching media - Great Britain. 147311.

362. SHAW, P.:

Some Sound Advice

Teaching Science, 1, 1983, No. 2, pp. 44-45.

The author provides information on the use of parabolic reflectors for recording the sounds produced by animals outdoors on a tape recorder. He quotes information from various didactical journals and provides instructions on the use of a parabolical sound reflector he has made and used.

didactics of biology - biology instruction - zoology - ethology - sound + recording - tape recorder - Great Britain. 147311.

363. WESSELÁ, E.:

Technické prostriedky na stredných zdravotníckých školách (Technical media for secondary nursing schools)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No. 1, pp. 7-8, 4 figs.

The XVth Congress of the Communist Party of Czechoslovakia stressed the need for nursing schools and other secondary school educating healthcare personnel to use technical and other modern teaching media more extensively in the course of instruction. In this context the author on the basis of her experiences in the East Slovakian region discusses the tasks and role of documentary assistants. This member of the teaching staff was newly established by the Ministry of Education at all schools. His first task was to study the teaching syllabi and curriculum in use and to draw up plans of media use and how to provide the school with these media. For the 6th five-year plan two thirds of all topics taught in schools have already been covered by these plans. Documentary assistants were trained in a special course (90 hours) organized by the Regional Pedagogical Institute at Prešov, which primarily concerned the use of various teaching media.

didactics of biology - biology instruction -
secondary nursing schools - didactical media -
Czechoslovakia. 147311.

257

10.96 Optical instruments, magnifying glasses,
mounting magnifiers, optical and electron
microscopes, exposure meters, cameras,
stereomicroscopes

364. GERLACH, D. - TENDEL, J.:

Fernsehmikroskopie - licht gemacht. Ein TV Adapter
mit eingebautem Objektiv (Televised microscopy -
easily done. A TV adapter with a built-in lens)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 12, pp. 444 - 445.

Various methods of televising microscopy exist.
The author considers the best to be the method where
a tele-lens is in the body tube of the microscope.
The author describes the system in detail and how
to use it. He recommends the use of a suitable
adapter, which makes it possible to connect the
television lens to the microscope. Thus the image
is magified twice, one by microscope and a second
time by the teleobjective.

didactics of biology - teaching media - microscope -
microscopy specimen - teleobjective - TV broad-
casting - FRG. 147311.

10.97 Areas devoted to instruction and to the storage of aids - biology workrooms, biology laboratories, biology storage rooms

365- HOMOLA, J.:

Vybavení pracoviště na gymnáziu (The furnishings of workrooms in general education secondary schools) Přírodní vědy ve škole, 34, 1982-1983, No. 8, pp. 283-285.

Various reasons of a subjective and objective nature lead to a situation where significant differences exist in the furnishings of biology workrooms in general education secondary schools, and this in turn influences the amount of experimental work done in biology courses. However, the stress placed on the modernization of biology instruction requires a larger number of experiments. The author's comments on this subject are based on his own experiences as a teacher and on discussions with architects and interior decorators, school authorities and others. He expresses the opinion that every school should have a special biology workroom, a laboratory and a storage room with adequate storage facilities for sterile and for dangerous chemicals and substances. He describes how these areas should be furnished and what equipment they should have.

didactics of biology - teaching media - biology workroom - storage rooms - laboratory - Czechoslovakia. 147311.

366. UDRŽAL, P.:

Nové universální stojany na stolky (New universal stands and tables)

Učební pomůcky ve škole a osvětě, 22, 1982-1983, No. 1, pp. 9-10, 4 figs.

The research and development department of the national enterprise Komenia has completed the designing of a set of universal portable stands and tables for use in classrooms. These items of classroom furniture are described in detail, as well their prices and how they can be ordered and the uses they can be put to.

didactics of biology - teaching media - biology workrooms - furniture - Czechoslovakia. 147311.

10.98 Mini-calculators in biology instruction, computers, information theory

367. BUTCHER, P.G. - MURPHY, P.J.:

Tutorial CAL and Biology Education

Journal of Biological Education, 17, 1983, No. 1, pp. 43-50.

Lit. 9, tabs. 3.

The CAL system (Computer Assistent Learning) is becoming an important teaching medium in Great Britain. Since 1970 schools have been making use of both computer hardware and software. The technology of computers and their programs has, however, been advancing more rapidly than their actual utilization in the teaching process; at present various graphic computer methods are available. In

the UK the BASIC, PASCAL and CAL methods are used. The author describes experiences with these learning programs, their advantages and drawbacks and their use at institutions of higher learning, as well as in secondary and primary schools. Also those who study in various extra-mural forms use computers in the home.

didactics of biology - biology instruction - teaching medium - computers - Great Britain. 147311.

368. McCONNEL, D.:

The Potential of Cyclops Videotex for Teaching Biology

Journal of Biology Education, 17, 1983, No. 3, pp. 231-236. Lit. 29, 3 tabs., 3 figs.

The author describes the use of the videotex CYCLOPS system especially designed for college biology courses and discusses the possibility of its use also in other subjects. The system is used by dialing a number; telephone lines are used for the transmission of sound and image to various classrooms, where pupils follow a television screen.

didactics of biology - biology instruction - college - university - teaching media - videotex - Great Britain. 147311.

369. CROVELLO, T.J.:

Computers in Education at NABT Meetings

The American Biology Teachers, 45, 1983, No. 5, pp. 279-281.

The author reports on a meeting of the National Association of Biology Teachers which discussed

the use of computers in education and held a panel discussion on the use of minicomputers. Teachers spoke very positively about two types of computer programs for biology: brief programs for individual use (for instance an application of the Hardy-Weinberg law) and more extensive programs provided by special organizations; both types are valuable. A study project on the use of computers was singularly unsuccessful; of 1000 questionnaires sent out, only 10 responded ! In 1983 a seminar on the use of computers in schools will be held in Philadelphia in the USA.

didactics of biology - biology instruction -
teaching media - computers - minicomputers - USA.
147311.

370. DAY, M.J. - RANDERSON, P.F. - BARTLETT, J.R.:
Computer Simulation of a Microbial Genetics Experiment as a Learning Aid for Undergraduate Teachers
Journal of Biological Education, 17, 1983, Ni. 1,
pp. 40-42, Lit. 2, 4 tabs.

The author discusses the use of computers in genetics teaching. For scientific purposes computers have been in use in genetics for 20 years. Here the author concentrates on microbial genetics and describes an experiment with sequences of 4 genes localized on the chromosomes of *Escherichia coli*. The students calculate the selection of mutant genes. The author explains and stresses the advantages of using computers for the simulation of various processes in genetics.

didactics of biology - biology instruction -
genetics - microbiology - bacteria - teaching media -
computers - Great Britain - 147311.

371. GEYER, T.A.:

An Introduction to Writing Computer Programs in
Ecology: Its Educational Value

Journal of Biological Education, 17, 1983, No. 3,
pp. 237-242. Lit. 11, 2 tabs., 3 figs.

The author describes opportunities for writing computer programs which are suitable for biology course, their advantages and disadvantages. Faulty programs can lead to mistakes conclusions; this is true for all sciences, but in biology it is particularly so. For instance population genetics, the simulation of various processes occurring in the ecosystem, etc. all can be used as material for computer programs, and provide an opportunity to verify the extent to which the student programmer understands the biological aspects of the problem.

didactics of biology - biology instruction - general
biology - genetics - population dynamics - simulation - computers - Great Britain. 147311.

372. KENT, J.W.:

Exploring the Realized Niche: Simulated Ecological
Mapping with a Microcomputer

Journal of Biological Education, 17, 1983, No. 2,
pp. 134-137.

The author describes a microcomputer program based on data from observations of a littoral zone

modification of a small river. The data is used to simulate an ecological map, which represents a sample of organisms as a response to local values of factors which limit the respective ecological niche. The interaction between predators and their prey, tropism and irregularities in distribution are clearly demonstrated. Alternative explanations concern the distribution of some prevailing species. Maps can show different situations, making it possible to develop biological significant implications without the monotonous collection of data and its manipulation. The program also makes it possible to engage in speculation over various alternatives.

didactics of biology - biology instruction - ecology - teaching media - computers - learning programs - simulation - Great Britain. 147311.

373. LOCK, R. - WOOD-ROBINSON, C.:

Data stores

Journal of Biological Education, 17, 1983, No. 1, pp. 13-14, Lit. 2, 1 photo, 1 tab.

The authors describe data collection and storage system which can work for 15 weeks without an operator and register data from biological, chemical or physical experiments. It functions also when volatile fluctuations occur and stores all information in a memory. The system registers responses from an oscilloscope, as well as slow changes of various parameters, which can then be repeated. In biology teaching the system is suitable for recording data from physiological or ecological experiments.

didactics of biology - biology instruction - ecology -
physiology - recording instrument - computer memory -
Great Britain. 147311.

374. OLTUNACU, E.A.B.:

Teaching The Principles of Genetics with the Aid
of an Heredoscope

Journal of Biological Education, 17, 1983, No. 1,
pp. 59-61. Lit. 4, 1 tab.

A heredoscope which demonstrates Mendel's laws of heredity from a quantitative, as well as qualitative point of view has proven to be very helpful in teaching genetics. With the aid of this instrument pupils learn the laws of heredity easily. In the article the use of the instrument is used on the example of the heredity of eye colour in the domestic cat.

didactics of biology - biology instruction -
general biology - genetics - teaching media -
heredoscope - Great Britain. 147311.

375. PARK, D.:

Taxis Through Computer Simulator Programmes

Journal of Biological Education, 17, 1983, No. 3,
pp. 225-230. Lit. 4, 4 figs.

In using a computer simulation programme, students learn about taxis, a topic which is often overlooked in biology courses. Locomotory movements of organisms or cells (taxis) can be provoked by various stimuli, such as chemicals, gravity, light or others. The author describes five different computer programmes on this topic.

didactics of biology - biology instruction - taxis -
computer simulation - learning programme - Great
Britain. 147311.

376. SORSBY, S.D. - HORNE, S.D.:

Computers in Ecology Education - The Study of a
Sand Dune System

The School Science Review, 64, 1983, No. 228,
pp. 425-434. 5 tabs.

The author demonstrates the use of a computer program for studying the ecology of a sand dune system, specifically in relation to botany. Field studies in ecology are essentially done in two ways in school; one method assumes the writing up of lists of species found in a specific environment and the study of their mutual relations, while the other method, which is more qualitative, extends the list of species which are found at a particular site with those species which are indicated for the particular environment. The latter method is considered to be more scientific. The author also discusses the problem of succession in sand dunes and describes a three day field work project which identified 42 species of plants and gathered a great deal of data which was then used in the computer program.

didactics of biology - biology instruction - ecology -
teaching media - computer programs - Great Britain.
147311.

377. VIALIS, A.:

BBC School Radio, Computers and the Technological Revolution

Teaching Science, 1, 1983, No. 3, pp. 76-77.

The author is the chief of school broadcasting at BBC. Here he discusses the opportunities provided by the ongoing technological revolution for school work and education in general. At present in the UK 20 000 schools have at least one to three computers and also cassette players for recording computer programs broadcast by radio, which have regularly been on the air since 1983. The author provides detailed information on these programs which also include computer programs for biology teaching.

didactics of biology - biology instruction - teaching media - computers - school radio - television - Great Britain. 147311.

11. Organizational forms of biology instruction

11.21 Laboratory work

378. HOGARTH, P.J.:

Crabs in Labs: The Shore Crab (Carcinus maenas)
as Teaching Material

Journal of Biological Education, 17, 1983, No. 2,
pp. 105-111.

Lit. 10, 8 figs.

At present about 26 000 species of Crustaceans are known, 69 % of them, i.e. 18 000 species belong to the subclass Malacostrata and over half of these (4 500 species) are crabs. They are the most widely spread and from the point of view of the most successful group of Crustaceans. The author describes the Shore crab in detail, as well as the uses it can be put to in a school biology laboratory.

didactics of biology - biology instruction -
zoology - Crustaceans - laboratory work - Great
Britain. 147311.

379. MANNARSMAHN, R.:

VIII. Mikrobiologisches Arbeiten in der Schule
(VIII. Microbiological work in schools)

Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 6, pp. 221-226.

The author discusses laboratory work in microbiology and provides a detailed list of laboratory

instruments and facilities required for microbiology, as well as instructions for teachers who are beginners in this type of work. The instructions can also serve for the founding of a microbiological laboratory in schools. Special attention is devoted to safety rules, as well as the safe storage of material which can be dangerous (cause infections). Besides basic lists of requirements, including instruments and chemicals, the author also describes basic microbiological techniques used for observations and experiments with micro-organisms. The author describes how to sterilize an environment, discusses vaccinations, the isolation of micro-organisms, their breeding on agar plates, their staining, the disinfection of a culture and its destruction after use.

didactics of biology - biology instruction - microbiology - organizational forms - observations - experiments - microbiology - FRG. 147311.

380. PETROV, S.K.:

Laboratorniyat urok na novi znaniya na tema "Funktsii na srnatchniya mozg" (Laboratory work for gaining new knowledge on the topic "The function of the spinal cord").

Biologiya i khimiya, 26, 1983, No. 1, pp. 43-48.
3 figs., 1 tab.

The success of a laboratory project in biology instruction depends on careful preparation. This should include a study of the relevant section of the textbook and methodological handbook, a careful formulation of the purpose of the experiment

and acquiring all the necessary material and equipment. The teacher should consider the organization of the lesson in advance and provide each pupil with a specific task and place. The author recommends beginning the lesson with a discussion to recall the function of the nervous system and what pupils know about it, as well as the structure of the spinal cord. During this discussion pupils should have before them pictures of a cross section of the spinal cord and the path which stimulation takes from the skin to the muscle, etc. and the reaction to this stimulus by the body. After this discussion pupils look for answers to question on the basis of experiments with a decapitated frog. In the final part of the lesson, pupils fill in a table which sums up individual parts of the experiment. Individual observations by pupils and their conclusion should be written down towards the end of the lesson.

didactics of biology - biology instruction - laboratory work - spinal cord - amphibians - observations - Bulgaria. 147311.

11.22 Practical exercises in biology

381. CHEREPENYA, L.P.:

K provedeniyu laboratornikh rabot pri izuchenii
temi "Stroenie i funktsii kletki" v X klasse

(On carrying out practical exercises when
teaching the topic "The structure and function of
the cell" in the 10th class)

Biologiya v shkole, 57, 1983, No. 5, p. 62.

In teaching the topic "The structure and function of the cell" the teaching syllabus requires a practical exercise on the structure of plant cells, observing the movement of cytoplasm, plasmolysis and deplasmolysis. The movement of cytoplasm can best be observed on the young leaves of *Elodea* (the author recommends cells from the central vein of the leaf). Plasmolysis and de-plasmolysis can be observed in stained cells of onion skins. Neutral red should be used for the staining; detailed instructions for staining are provided.

382. DOSTÁL, P.:

K nové koncepci přírodopisné části chemicko-biolo-
gických praktik pro 7. ročník základní školy

(On the new concept of the natural science part
of the chemical and biological practical exercises
taught in the 7th class of basic school)

Přírodní vědy ve škole, 34, 1982-1983, No. 2, pp.47-48.

The implementation of the new project of the
Czechoslovak education and teaching system in this

year will reach the 7th class of basic school. New textbooks are already available, as well as methodological handbooks for teachers. The article provides information on the mandatory elective subject called chemical and biological practical exercises. On the basis of practical experience a number of changes have been introduced in the definitive version of the biology textbook for the 7th class of basic school. The main purpose of this new subject, as defined by the curriculum, is to complete the learning of skills, attitudes convictions and behaviour of pupils and to influence their making a vocational choice and their fulfilling all the objectives of work, polytechnical, moral, aesthetical and defence education. The biological component of this new subject precedes the chemical section, which then continues in the subsequent teaching of chemistry. The author describes the teaching syllabus for this subject in detail. It includes also a botanical field excursion and the subsequent use of the collected plant material, as well as a zoology excursion, the use of literature on various biological subjects, the observation and collection of insects, the collection and processing of bones, learning microscopy techniques and studying environmental influences upon various organisms.

didactics of biology - biology instruction - chemistry instruction - practical exercises - basic school - 7th class - Czechoslovakia. 147311.

383. JURČÁK, J.:

Akvarijní rostliny v botanické praxi (Aquarium plants in a practical botany exercise)

Přírodní vědy ve škole, 34, 1982-1983, No. 8, pp. 285-287.

Lit. 15,1 fig., 16 photos.

Aquarium plants are highly suitable material for demonstrating ecological relations, as well as the influence of the environment on the morphology and anatomy of plants. Microphotographs demonstrate the internal structure of some vegetative organs of selected aquarium plants. The author stresses the marked anatomical features of these plant structures which are connected with their adaptation to their environment. These plants can also be used in botany exercises where not only anatomy, but also ecology are studied. Two types of water plants are studied: hydrophyta, which are true water plants and amphibious plants. The author describes a number of these plants in detail, and their use in general education secondary schools.

didactics of biology - biology instruction - botany - practical exercise - laboratory work - aquarium plants - Czechoslovakia. 147311.

384. STANEK, J.A.J.:

Why Don't Cells Grow Larger ? A Lab Exercise
The American Biology Teacher, 45, 1983, No. 7,
pp. 393-395. Lit. 1, 1 tab., 4 figs.

The author provides an interesting analysis of the relation between the area of surface and the volume of a cell when it is dividing. This is one of the topics from the Biological Sciences Curriculum Study (BSCS). The larger a cell is, the smaller is the relative size of its surface for the intake of food. The author provides instructions for various observations and experiments, which deal with this relationship in cells.

didactics of biology - biology instruction - cytology - observations - laboratory work - experiments - cells - USA. 147311.

11.23 Hobby clubs

385. BONCZKIEWICZ, A.:

Wir laden junge Aquarianer ein (We invite young aquarium buffs to join us)
Biologie in der Schule, 32, 1983, No. 2-3, pp.108-109.
1 fig.

On the basis of the example of the activities of an aquarium hobby club at E. Thälmann Young Pioneer House in Berlin the author shows how young people can be guided toward an interest in the natural sciences, by providing them with opportunities

for carrying out experiments and observations. The author also provides detailed information on four different projects which the aquarium hobby club, which she works with, undertook.

didactics of biology - biology instruction -
elective subjects - hobby club - aquariums - GDR.
147311.

386. GAUDON, J.Y.:

Recherche de la nourriture et vision des couleurs chez l'abeille (The collection of food by and the sight of the honey bee)

Biologie, Géologie, 70, 1983, No. 4, pp. 791-794.
2 figs.

The author describes a method of teaching pupils in the 5th class, but it is also suitable for the work of a hobby club. The project described concerned the life of the honey bee, how it collects food and how it perceives colours. During the first lesson the teacher describes the lives of bees in general and asks pupils for questions. These are written down and later consulted with an experienced bee-keeper. In the second lesson a bee hive is visited, where the bee keeper is present and the questions from the previous lesson are answered. Pupils bring with them boxes which are coloured in two colours each: blue and yellow, green and purple, blue and yellow etc. One box should be red and black. Pupils form groups which take up positions about 20 meters from each other and about 30 meters from the bee hive. When the bees fly out of their hives, pupils observe the

behaviour of the bees in relation to the colours of their boxes. The bees already 1 meter away from the box see that although they have been lured by the colours, the boxes do not in fact contain food. During the third lesson all findings are summed up, and if pupils show an interest, the project can continue. The author shows how the coloured boxes can be made.

didactics of biology - zoology instruction -
ethology - insects - experiments - hobby clubs -
honey bee - France - 147311.

387. HUNDT, R.:

Zur organisatorisch-didaktischen Gestaltung komplexer
Schülertätigkeit in der AG/ R/ "Sozialistische
Landeskultur" (The organisational and didactical
concept of pupil activities in a hobby^{club} called
"Socialist nature conservation")

Biologie in der Schule, 32, 1983, No. 2, pp. 74-80.
9 figs.

A hobby club, in contrast to mandatory subjects, provides opportunities for dealing in greater detail with problems concerning nature conservation and environmental control. Pupils will have fewer problem in choosing interesting topics for study if the relevant algorithm is found for solving problems. The author cites three examples of activities in a hobby club which concern measures for nature conservation and developing greenery in the vicinity of a newly opened kindergarten.

didactics of biology - biology instruction - hobby
club - nature conservation - environmental control -
GDR. 147311.

388. KERSTEN, A.:

Gesellschaftlich nützliche Tätigkeit in biologischem AG/ R/. (Socially beneficial activities in a hobby club)

Biologie in der Schule, 12, 1983, No. 6, pp. 244-247.

Independence and creativity are characteristics of elective courses. The demands made upon a hobby club teacher are very high. One of the problems is to find a correct balance between the requirements of teaching and those of practical work. A questionnaire was sent out to a number of experts in various fields where they were asked to express their opinion of socially beneficial work done by hobby clubs in schools. The author provides a survey of responses, specifically in relation to three types of hobby clubs: for agriculture, gardening and forestry operations; aspects of nature conservation and hygiene were stressed in relation to all three types.

didactics of biology - biology instruction - elective teaching - hobby club - socially beneficial work - GDR. 147311.

389. KOMAROVA, Z.L.:

Nash krushok (Our hobby club)

Biologiya v shkole, 57m 1983, No. 1, pp. 61-62.

The author has for several years been supervising a hobby club of young natural scientists. In this article she describes her work in detail, including the division of pupils into groups, planning the work of the hobby club, the help provided by the hobby club to normal biology teaching,

the publication of a magazine by the hobby club and other activities.

didactics of biology - biology instruction - elective courses - hobby clubs - USSR. 147311.

390. MASŁOWSKI, O.:

System obligatoryjnych, fakultatywnych zajęć terenowych w programach biologii w ČSSR

(The system of mandatory and elective field work in the biology curriculum in Czechoslovakia)

Biologia w szkole, 16, 1983, No. 5, pp. 305-307.

Since 1976 a new project is being implemented in Czechoslovakia, which includes kindergartens, basic schools, and four-year secondary general education schools. Basic schools are divided into two levels: the first from classes 1 to 4 and the second which includes classes 5 to 8. 17 mandatory subjects are taught in basic school and a number of elective subjects. The author also describes in detail teaching syllabi for various classes as far as field work in the natural sciences is concerned and stresses the modern aspects of the new system.

didactics of biology - biology instruction - new curricula - new syllabi - field work - Czechoslovakia. - Poland. 147311.

391. PASKALEV, G.:

Kraevedskata izsledovatelska i prakticheska rabota
na uchenite v krzhok na opazvane na prirodata

(Regional research and practical work done by pupils
in nature conservation hobby clubs)

Biologiya i khimiya, 26, 1983, No. 6, pp. 46-51.

Learning more permanent knowledge, skills and habits as far as nature conservation is concerned is closely connected with the participation of biology teachers and their pupils in solving specific research and practical projects connected with nature conservation. The author cites the names of several outstanding biology teachers who have shown great initiative in this area, as well as the names of various staff members from various scientific institutions and those of higher education who have helped secondary school teachers and their hobby clubs in this area. Pupils from the 4th to 10th class can become members of nature conservation hobby clubs. Their plans of activities include the following topics: a study of flora and fauna in the region, making ostensive teaching aids out of collected material and forming a permanent interest on the part of pupils in nature and its problems. As far as fauna in the region from which the author comes is concerned, hobby clubs concentrated specifically on insects, amphibians, reptiles and birds. On the basis of studying the content of the stomachs of dead vertebrates and an assessment of the data thus acquired, older pupils in hobby clubs have contributed to the debate on the negative influence of some species of insects. Pupils came to the con-

clusion that the insects in question make an important contribution to the specific biocoenoses in the region studied. In botanical studies, pupils have studied about 15 species of protected plants, prepared maps which showed places where they can be found, etc. The hobby clubs have also made important contributions to making nature conservation more popular among young people.

didactics of biology - biology instruction - organisational form - hobby club - nature conservation - Bulgaria. 147311.

392. RYMKOV, V.V.:

O krushkovoy rabote v nashey shkole (On hobby club activities in our school)

Biologiya v shkole, 57, 1983, No. 5, p. 72.

The school where the author teaches has already for seven years had a Young Biologist hobby club with 27 members from the 7th to 9th classes. The hobby club has six sections: for helminthology, phenology, pedology, entomology, ornithology, and botany. Each group has 5 to 6 pupils and meets every two weeks. The author describes the work of these various groups.

didactics of biology - biology instruction - elective classes - hobby clubs - 7th to 9th class - USSR. 147311.

393. SARETT, R.:

Amenagement d'une salle d'élevage dans le cadre d'un
P.A.E. (Classroom furnishings for teaching the
natural sciences)

Biologie, Géologie, 70, 1963, No. 4, pp. 797-801.

1 fig.

If students are to properly study the development of various animals they should have proper facilities and furnishings. The author has designed a special classroom for biology, which pupils can help make themselves, together with their teachers. Pupils in the fifth class can also make aquariums and terrariums; pupils in the upper classes can make more demanding facilities and installations. In such a classroom pupils can breed birds, small mammals, butterflies, snails, fish and a number of other animals. Photographs, which can be made by the pupils themselves, are also a good way of improving the looks of a classroom and such activities are interesting for pupils. They can, for instance document the growth of various animals, etc. This type of work by pupils should be accompanied by reading, for instance about the development of animals, etc.

didactics of biology - biology instruction - zoology -
breeding animals - hobby club - classroom furnishings -
France. 147311.

394. WESSEL, V.:

Untersuchungen zum Vorkommen von Schad- und Nutz-
insekten in einer Obstplantage - Bericht über ein
Projekt (A study of the incidence of useful insects
and pests found in a fruit orchard - report on
project)

Der biologische Unterricht, 19, 1983, No. 3, pp.51-53.
Lit. 2.

The author describes practical activities by pupils in protecting a fruit orchard against insect pests. The project was based on cooperation with the owner of the orchard; pupils collected insects by various methods (attracting insects by light or pheromones and by shaking them off plants) and then identified their catch, while at the same time classifying these insects according to whether they are useful or pests. The author describes the organization of the project and assess the findings arrived at. This activity was considered to be interesting and useful by pupils, teachers and owners of the orchards used.

didactics of biology, biology instruction - organizational form - elective subject - hobby club - entomology - orchard - FRG. 147317.

395. SVOJSÍK, J.:

Výuka přírodopisu a přírodovědný oddíl PO SSM

(Teaching the natural sciences and the nature studies club of the Young Pioneer Organization of the Socialist Union of Youth)

Přírodní vědy ve škole, 14, 1982-1983, No. 8, pp. 288-289.

The author stresses the importance of original natural objects for teaching the natural sciences according to the new model of teaching and education. Young Pioneer hobby clubs provide very good opportunities for finding and mounting various natural specimens. The author describes the activities of such a hobby club at the basic school in Vyšší Brod, which called themselves The Wolves and which was supervised by the school nature studies teacher. The members of the club provided the school with various specimens, took care of the living-nature room (also during the summer vacation) and provided active support to the nature studies teacher. The club also organized various activities, such as work in a forestry operation. The living-nature room which the club members care for, includes aquarium fish, molluscs, stick insects, gerbils, guinea pigs of various breeds and others.

didactics of biology -biology instruction -zoology, elective courses -hobby clubs - Czechoslovakia.
147311.

11.31 Excursions, hiking camps, field work

396. RUBINSHTEYN, N.A.:

Ekskursii v zoopark dlya shkolnikov (An excursion to the zoo with pupils)

Biologiya v shkole, 57, 1983, No. 2, pp.40-43. 1 tab.

Ecological education is an important component of communist education of the young generation. It provides pupils with scientific knowledge about nature and society and instills in them a responsible attitude towards nature and its conservation. Zoological gardens can provide valuable help in this type of education; there is an extensive network of these zoos throughout the Soviet Union. The staff of zoos consider cooperation with schools to be an important part of their activity and organize lectures for all age groups, whose content is in harmony with the biology teaching syllabi of schools, especially the zoology syllabus for the 7th class. The author describes the organization of an excursion of school children organized by the staff of the zoological garden in cooperation with the teacher, which concentrated on the topic "The variety of mammals and their conservation".

didactics of biology - biology instruction - zoology - zoological gardens - excursions - nature conservation - USSR. 147311.

397. SKOTNICOVÁ, J.:

Možnosti biologických exkurzí v Ostravě

(Opportunities for biological excursions in the city of Ostrava)

Přírodní vědy ve škole, 14, 1982-1983, No. 4, p. 131.

The author discusses problems connected with the organization of nature excursions in the industrial agglomeration of Ostrava and its vicinity. The pit heaps which surround the anthracite coal mines (there are 70 of them in Ostrava) are in the majority already burnt out, but some are still burning. They are made up of Carboniferous waste rock, which is unsuitable for the growth of plants. The author recommends selecting an older heap for an excursion, where a number of exotic plants can be found, which are not typical for our flora. Besides ruderal plants, also thermophilous spiders can be found. In 1970 the area of the Polanský forest was declared a State nature reserve. This is a meadow and forest area in the valley of the Odra river. The author describes various other nature reserves or interesting places which pupils can visit in the vicinity of the city.

didactics of biology - organizational form - excursion - city - nature conservation - Czechoslovakia. 147311.

398. SUKOSOVA, M.N.:

Vsesoyuznaya turisticheskaya kraevedecheskaya ekspeditsiya pionerov i shkolnikov "Moya rodina - SSSR"

(The all-union tourist regional expedition of Young Pioneers and pupils "The USSR - my motherland")

Biologiya v shkole, 57, 1983, No. 2, pp. 69-71.

In 1983 the fourth stage of the expedition cited in the title was completed and in the period 1984-1986 the fifth stage will take place. The purpose of this project is to arouse in pupils an interest in nature conservation and the willingness to be active in this area. The article describes one of the activities undertaken during the project, called "Studying the secrets of nature" which concerns mostly biology. Pupils also collected medicinal plants, on the basis of instructions issued by the Ministry of Health Care of the USSR. Other tasks were provided by the Ministry of Land Reclamation and the Geographical Society of the USSR.

biology instruction - organizational forms of instructions - excursion - nature conservation - USSR.
147313.

399. VASILEVSKAYA, S.D.:

Zimnaya ekskursiya po izucheniyu ptits gorodskogo parka (A winter excursion to study the birds in a city park)

Biologiya v shkole, 57, 1983, No. 2, pp. 32-35.
2 figs., lit. 2.

According to the teaching syllabus the topic birds should be taught with the help of an excursion. In cities it is best to visit the local park. The

excursion can also serve to prepare for a Day of Birds. The main purpose of the excursion is to learn about the species found in parks and learn to identify them, as well as to learn about their conservation and way of life. The author discusses various organizational aspects of the excursion and also how to prepare pupils for the excursion so that it is spent in a productive manner. Also a survey of the different species found in various areas of the country is provided, including data on the food they eat, how they build nests, etc.

biology instruction - zoology - birds - organizational form of teaching - excursion - USSR. 147313.

400. DYLLA, K.:

Palaeobiologie vor Ort. Vormaliger Leistungskurs auf Steinheim - Exkursion (Palae-biology on the spot. The most recent final class of a general education secondary school on an excursion to Steinheim) Praxis der Naturwissenschaft - Biologie, 12, 1983, No. 3, pp. 90-92. Lit. 4, 1 model for worksheet.

The author describes an excursion with older pupils to a meteor crater and sand pit at Steinheim. The purpose of the excursion was to become acquainted with palae-biology and its various aspects, which can be very interesting for pupils. A chronology for studying the sands at Steinheim is provided; many aspects of Darwin's theory have been verified here, since it is possible to follow the evolution of a number of different molluscs. The pupils themselves can find various fossils. During the excursion also the museum at the crater is visited, as well as a geological trail and the Hauff museum of dinosaurs.

biology instruction - palae-biology - geology -
organizational forms - excursions - Tertiary era -
PRG. 147313.

11.32 Socially beneficial work, voluntary work done
by pupils

101. LUKYANOVA, B.M.:

Shkolniki na polyakh Moldavii (Pupils on the fields
of Moldavia)

Biologiya v shkole, 57, 1983, No. 1, pp. 54-59.

In the introductory part of the article the author describes the Moldavian Soviet Socialist Republic and its nature, which provides excellent conditions for agriculture. She then discusses the contribution made by Moldavian youth to the harvest. Moldavian schools organize voluntary pupil work teams which help out in agriculture and at the same time serve for the vocational guidance and counselling of young people. Pupils also help out in forestry operations where at the same time they learn about forest biology.

didactics of biology - biology instruction - organizational forms - socially beneficial work -
voluntary work - Moldavia - USSR. 147317.

11.4 Biology Olympiads, biological competitions

402. KOHLER, R.:

Biologieolympiade - von einer Fachkommission organisiert (A biology Olympiad - organized by a special commission)

Biologie in der Schule, 32, 1983, No. 1, pp. 35-36.

Biology olympiads provide opportunities to become acquainted with talented pupils and then continue to work with them. The town of Arnstadt alternates biology and chemistry olympiads each year. The author describes the organization of the olympiad and how large numbers of pupils were persuaded to participate.

didactics of biology - organizational form - biology olympiad - GDR. 147313.

403. ZDEBSKA, J. - SIEROSŁAWSKA:

Final XII olimpiady biologicznej pod hasłem "Gleba i życie" (The finals of the XIIth biology olympiad with the motto "The soil and life")

Biologia w szkole, 36, 1983, No. 5, pp. 306-309.
1 tab.

The finals of the biology olympiad in Poland were again held in the auditorium of the Warsaw State University in May 1983. In the 1st level school rounds 1457 pupils competed, 815 pupils went to the district rounds (535 girls and 281 boys) and of these, 115 pupils went to the national finals (50 girls and 65 boys). 20 became laureates of the competition.

and their names are cited in the article. First place was taken by Piotr Widłak, a pupil of the A. Mickiewicz Secondary School in Katowice. His teacher was Maria Laksowska.

didactics of biology - organizational form - biology olympiad - Poland. 147313.

11.6 Individual independent homework

404. MAIHOFER, W.:

Zur Gestaltung der Hausarbeitswoche für Schüler der Klassen 11 und 12 im Fach Biologie (Giving pupils weekly homework in the 11th and 12th classes)
Biologie in der Schule, 32, 1983, No. 6, pp.242-243.

Pupils in 12th class received weekly homework assignments which took up about 30 hours. It was difficult to choose suitable topics for this type of work, but nevertheless pupils were given lists of topics to choose from. The author describes his experience with this type of homework and makes various suggestions for future work.

didactics of biology - organizational form - homework - pupils - GDR. 147313.

405. Zur Durchführung der Hausarbeiten in den Klassen 11 und 12 (Carrying out weekly homework assignments in the 11th and 12th classes)
Biologie in der Schule, 32, 1983, No. 7-8, pp. 315-318.

Before weekly assignments are given, organizational, methodological and other preparations should first be undertaken. It is also important to devote sufficient attention to the subsequent assessment of this type of homework. This introductory essay to a subsequent discussions by teachers which is organized by this journal is from the editors of the journal and discusses such problems as the subject-matter of the assignments, how they should be assessed and how to draw conclusion from their manner of execution.

didactics of biology - biology instruction -
organizational forms - homework - pupils - GDR.
147313.

11.7 Work in a biology hobby club

406. SCHARL, W.:

Mikroskopische Arbeiten im 9. Schuljahr im Rahmen einer freiwilliger Arbeitsgemeinschaft (Microscopy work in the 9th class within the framework of a voluntary hobby club)

Der Biologieunterricht, 19, 1983, No. 4, pp.533.
Lit. 41, 5 figs.

The author describes his work with pupils in a biology hobby club, where he taught them to use a microscope. An analysis of the curriculum of general

education secondary schools in Bavaria indicates that microscopy is taught both in regular classes and in hobby clubs, but the work in hobby clubs has a number of advantages, since pupils already have basic knowledge and are able to concentrate on more interesting and problem aspects. The author recommends working in groups of ten pupils. Only pupils with a serious interest in this work are accepted for hobby club activities. Also the furnishings of a special classroom for this purpose are discussed, as well as the amount of time to devote to this work. Also suitable topics are discussed, as well as suitable objects for microscopy and how to obtain them.

didactics of biology - organizational form - hobby club - practical exercises - hobby clubs - elective courses - microscopy - GDR. 147313.

11.8 Field work and summer natural science activities, scientific trails

407. BODEN, J.:

L'eau dans le Comtal Venaissin (Water in the Venaissin borough)

Biologie, Géologie, 70, 1983, No. 1, pp. 91-94.

The Venaissin borough is near Avignon. The soil is partially lime rich and partially alluvial. The author suggested to her pupils a year-long project to study the waters of the district from various points of view. The project was divided into three parts: 1) determining the various kinds of water found

in the area - rivers, streams, canals, ponds, etc.
2) for what purposes the water is used - drinking water, for watering plants, for cleaning, etc.,
3) water and people's thinking, the symbol of water as a source of life, as a destructive force, as a means of transportation, etc. The author describes the various activities the pupils participated in during the year. Pupils also made public bulletin boards to describe their activities. Pupils learnt a great deal and became interested in various aspects of these problems.

didactics of biology - biology instruction -
organizational forms of teaching - field work -
water - France. 147313.

408. CICHY, D.:

Zajęcia terenowe w realizacji programu nauczania biologii (Field work in implementing the biology teaching syllabus)

Biologia w szkole, 36, 1983, No. 3, pp.165-168.
lit. 11.

The author stresses the importance of field work in biology, which is much more effective in comparison to short-term excursions where one or two hours are too short a time to get anything done. The author stresses the scientific and educational objectives of field work and cites positive examples from Poland and elsewhere.

didactics of biology - biology instruction -
organizational forms - field work - Poland. 147313.

409. ČEŘOVSKÝ, J.:

Otázky a odpovědi kolem stezek (Questions and answers concerning science trails)

Věda a technika mládeži, 37, 1983, No. 1, pp.20-21.

7 photos

Science trails represent a form of science education and teaching towards nature conservation and environmental control. In Czechoslovakia they are being built according to the principles of a decree issued by the Czech Ministry of Culture dated December 8th, 1981. The trails are supervised by nature conservation bodies and the Czechoslovak Union of Physical Education maintains them; its members do various work connected with their cleaning and maintenance. Young people participate in this work on a large scale, especially members of the Young Pioneer organization and others. Some scientists have, however, pointed out that by opening the trails, the natural environment of their vicinity is threatened, so that not all problems connected with these science trails have been solved to the satisfaction of all.

didactics of biology - biology instruction - organizational forms - science trail - nature conservation - ČSSR. 147313.

410. GOELTENBOTH, F. - SIGLOCH, W. - WEIGOLD, H.:

Das schulnahe Kleinbiotop. Untersuchungen im Rahmen des projektbezogenen Unterrichts (A small biotope close to the school. A study within the framework of project teaching)

Der Biologieunterricht, 19, 1983, No. 2, p. 5-22.

Lit. 23, 4 tabs., 8 figs.

At the general education secondary school in Moessingen special projects have been organized. Pupils themselves organized these projects, with the help of teachers and their parents. A total of 75 projects have been carried out, among them for instance the following: Marshlands, Karst geology in the Swabian Alps and Ecological observations in the vicinity of the school. The author describes work methods and results which have been very positive.

didactics of biology - biology instruction - organizational forms of instruction - field work - project teaching - FRG. 147313.

411. KEMP, D.:

Epiphyte distribution on tree bark

Journal of Biological Education, 17, 1983, No. 2, pp. 93-97, Lit. 8, 1 fig., 3 photocols.

Ecological problem are best studies outdoors, in the course of field work. A suitable topic is the distribution and frequency of epiphytes on tree bark. Depending on the age of the students the topic can be included either in the context of biology or ecology. Students learn various ecological techniques, the relation of epiphytes to biological and non-biological factors in the environment, etc.

Also such factors as precipitation, exposition to the cardinal points, humidity, the amount of light available, altitude above sea level, the specie of the host, which woody species are found in the immediate vicinity of the host, the height of the epiphyte above ground, the circumference of the tree trunk, the age of the host plant and the amount of air and water pollution found at the locality. Also such aspects as lichens, algae, fungi, etc. must be studied in this context. Some attention should also be devoted to the influence of animals upon epiphytes.

didactics of biology - biology instruction - field work - ecology - epiphytes - woody species - Great Britain - 147313.

412. LEONARD, W.H.:

A Biomes Field Trip

The American Biology Teacher, 45, 1983, No. 5, pp. 273-275. Lit. 3, 2 transparencies, 1 fig.

The author defines a biome as a specific flora and fauna. Biomes cannot be studied in the classroom, but only outdoors in the course of field work. Various modern American biology textbooks which deal with this concept are described and recommended, for instance the Green Version of the BSCS textbook and others. The author describes in detail the field work done by the Piedmont School based on various bio-geographical projects during which students did various successful experiments. In one field trip students took a bus trip across the mountains to the Pacific ocean coast in California and collected

various material every 15 to 20 minutes so that the excursion included marshland, meadows, oak and other deciduous forests, forests of conifers, coastal scrub and tidewaters of the Pacific ocean as environments. Together with the material, students collected various data and learnt to record all their findings for subsequent processing. The flora and fauna found in various biomes are described in detail.

didactics of biology - biology instruction - organizational forms - field work - group projects - ecological observations - USA. 147313.

413. Leto oddikha i truda (A summer of rest and work) Biologiya v shkole, 57, 1983, No. 3, pp. 3-6.

An editorial which stresses the importance of usefully spent school vacations both for pupils and teachers. During the school year 1982-1983 the life of all educational collectives in the USSR was influenced above all by important events and by the fulfilling of tasks formulated by the May and November plenary sessions of the Central Committee of the Communist Party of the Soviet Union, as well as by documents accepted by the festive meeting of the CC CPSU, the Supreme Soviet of the USSR and the Supreme Soviet of the Russian Federation, which was devoted to the 60th anniversary of the founding of the USSR and the speech made by the Secretary General of the Party, J.V. Andropov. These events also defined the content of summer activities on the part of youth and new forms of work by educational personnel. The erudition and experience of teachers is being utilized in their work in Young Pioneer summer camps when they organize the collection of

medicinal herbs, and in evening programs devoted to problems of nature conservation. During the day-time, teachers organize help to local collective farms, tourist expeditions and lead work-teams of pupils. All endeavours of teachers and pupils will be directed towards having young people spend a useful vacation period.

didactics of biology - biology instruction -
organizational forms - field work - pupil work
teams - USSR. 147313.

414. WERNER, E.:

Obstgehölze - richtiger Schnitt und Veredelung.

(Fruit trees - how to correctly cut and graft for strain improvement)

Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 1, pp. 9-13, lit. 1, 5 worksheets.

The author describes the teaching of a very interesting school biology project which concerns the care and strain improvement of fruit trees. Pupils first become acquainted with various species of fruit trees, how they should be cared for, how to cut them and improve their strain. Pupils also learn to distinguish leaf, bloom and mixed buds, how bloom buds are founded (after the tree has been in bloom at the end of May and beginning of June) and become acquainted with grafting techniques and seeding. The worksheets supplied by the author serve for verifying how pupils have learnt this important and practically usable knowledge and how they have acquired the skills necessary to practically use the knowledge.

didactics of biology - biology instruction -
fruit cultivation - fruit trees - grafting -
seeding - strain improvement - FRG. 147313.

415. WILKES, J.W.:

Students as Scientists: A Study of the Effects of
Sewage Plant Effluent

The American Biology Teacher, 45, 1983, No. 8,
pp. 415-418, 423. 5 figs.

The article describes the work of a high school in Ashland which concentrates its work in biology or field work. Since 1977 six different classes have systematically studied the local river at a place called Jerome Fork. Specifically the pollution of the river is studied including the effects a nearby sewage plant and its effluent have on the water, its oxygen content, carbon dioxide content, the temperature of the water and its nitrate content, as well as the strength of the current, the width and depth of the river, etc. The students built two stations for taking samples of the water and learnt to use a spectrophotometer for analysing the water's nitrate content. A total of 24 groups of students have studied the river during the five years described by the author. Special studies were devoted to the flora and fauna of the river and tables provide a summary of students' work in this area. The outcome of this type of project study is assessed in a very positive manner and represents an advance in high school ecology and microbiology courses.

didactics of biology - biology instruction - micro-
biology - ecology - field work - river - hydro-
biology - group work - USA. 147313.

416. WILSON, C.M. - CROTHERS, J.H. - OLDHAM, J.N.:

Realised niche: the effects of a small stream on
sea-shore distribution patterns

Journal of Biological Education, 17, 1983, No. 1,
pp. 51-58. Lit. 17, 6 figs.

A combination of field work and laboratory exercises can be used to demonstrate to pupils the notions of potential, optimum and realised niches, which are important for ecological studies. The authors describe a study in which the flora and fauna found in coastal tidal waters are influenced by a small stream. The mutual interaction of various physical, chemical and biological factors can be studied and on the basis of the data gained, the notions of different kinds of niches formed. The sea-coast is very favorable for this kind of work since various ecological patterns are clearly visible side by side and observations here are very fruitful; they cannot be substituted for by laboratory experiments which can serve only as supplementary analytical exercises. Also computer simulation can be used to study assumed development patterns, as well as various graphical methods.

didactics of biology - biology instruction -
organisational forms - field work - laboratory work -
teaching methods - observations - experiments -
computer simulation - Great Britain. 147313.

417. ZIGERS, D.A.:

An Urban Example for Teaching Interspecific
Competition

The American Biology Teacher, 45, 1983, No. 5, pp.
pp. 276-277. Lit. 5, 1 fig., 1 tab.

The usual method of teaching ecology in schools assumes a very limited scope, more limited than for instance the scope of molecular biology taught in schools, in spite of the fact that the impact which ecology has upon man is much more important. Usually ecology is taught in a highly specialized cultural landscape. Laboratory exercises in ecology pose a number of problems and are difficult to execute. On the other hand students should be taught how to think in an ecological way, which is not easy in an urban environment. Ecological notions and the ecological properties of a niche can be demonstrated in an urban environment on the basis of a discussion of various foods served during various times of the day, in various regions and various seasons, as well as in urban or rural settings; this variety indicates a specific tolerance towards the environment.

didactics of biology - biology instruction -
ecology - human population - urban environment -
food - USA. 147313.

12. Planning biology instruction

418. BROVKIN, E.T. - REZNIKOVA, A.Z.:

Odin iz variantov tematicheskogo planirovaniya
uchebnogo materiala po zoologii v VII klasse

(One alternative for thematic planning of the
teaching syllabus for zoology in the VIIth class)
Biologiya v shkole, 57, 1983, No. 5, pp. 44-51.
2 tabs.

The continuation of an article published in
No. 2, 1983 of this journal which analyses the
concept for and approach to the topic of Chordata
(46 lessons, including subject matter from the
lancelet to amphibians). For each teaching lesson
the article provides recommendations for the use
of teaching media, and describes the structure of
the lesson and its content, as well as teaching
methods and logical approaches, homework, etc.

didactics of biology - biology instruction -
zoology - Chordata - thematic planning - basic
school - 7th class - USSR. 147313.

419. RUBACHEVA, L.I.:

Odin iz variantov tematicheskogo planirovaniya
uchebnogo materiala po obshchey biologii - X klass

(One alternative for thematic planning of the
teaching syllabus for general biology in the 10th
class)

Biologiya v shkole, 57, 1983, No. 5, pp. 51-56.

In a continuation of an article published
in issue No. 4, 1983 the author here describes two

teaching units which deal with general biology problems - the biochemistry of the cell: "The reproduction and individual development of an organism" (7 lessons) and "The development of life on Earth" (2 lessons). For each lesson the author provides recommendations for the use of teaching media and describes the structure and content of the lesson, methods and logical procedures, as well as homework.

didactics of biology - biology instruction -
general biology - thematic plan - basic school -
10th class - USSR. 147313.

420. SHUBKINA, L.S.:

Odin iz variantov tematicheskogo planirovaniya
uchebnogo materiala po botanike - V - VI klass
(One alternative for the thematic planning of the
teaching syllabus in botany in the Vth and Vith
classes)

Biologiya v shkole, 57, 1983, No. 5, pp. 29-44.
7 tabs.

The continuation of an article published in
issue No. 4, 1983 which analyses the concept of
teaching the topic "Seeds" (8 teaching lessons),
"Roots" (9 teaching lessons) and the introductory
lessons to botany in the 6th class (10 lessons)
where the systematic botany of the higher plants is
taught. Several lessons are devoted to basic groups
of plants (bacteria, algae, fungi). For each lesson
the author recommends the use of teaching media,
the structure and content of the lesson, the use
of methods and logical procedures, as well as home-
work and how to compile survey tables.

didactics of biology - biology instruction -
thematic plan - botany - basic school - 5th class -
6th class - USSR. 147313.

12.1 Instructions for drawing up plans for biology
instruction and for individual topics

421. BLINOVSKAYA, J.V.:

Odin iz variantov pourochnogo raspredeleniya
uchebnogo materiala po obshchey biologii - IX klass
(One alternative for the thematic planning by
lessons of the teaching syllabus for general biology
in the 9th class)
Biologiya v shkole, 57, 1983, No. 4, pp. 40-48.
Lit. 4, 4 tabs.

The thematic plan recommended here by the author concerns 102 lessons devoted to the general biology course (34 lessons in the 9th class and 68 lessons in the 10th class). This thematic plan is based on the textbook "General Biology" published in Moscow in 1983. The article deals in detail with the first 17 lessons in the 9th class. It also formulates objectives as far as the forming of a scientific worldview are concerned, enumerates important terms and notions which pupils should learn, as well as required skills and habits they should acquire. The author provides a survey of recommended teaching aids for each lesson, as well as the structuralization of the lessons, which is uniform. Suggestions for individual projects are intended for group work. For laboratory work the

author recommends preparing cards with assignments on them. Part of the plan are also methodological recommendations for excursions. Homework is considered to be an integral part of the teaching process and should be given in every lesson. In conclusion the author provides a bibliography for teachers.

didactics of biology - biology instruction - general biology - 9th class - thematic planning - USSR.
147307.

422. BROVKINA, J.T. - REZNIKOVA, V.E.:

Odin iz variantov tematicheskogo planirovaniya uchebnogo materiala po zoologii. - VI Klass

(One alternative for the thematic planning of the teaching syllabus for zoology in the 6th class)
Biologiya v shkole, 57, 1983, No. 3, pp. 30-38.
6 tabs.

This thematic plan, recommended by both authors, is a continuation of a thematic plan for the zoology teaching syllabus for the 6th class published in issue No. 2, 1983 of this journal. This article contains a plan for teaching the topic Arthropods, which is divided into 16 lessons. For each lesson the authors provide a survey of recommended teaching media, describe the content of the lesson, its structure and various methodological and analytical approaches. Also plans for carrying out laboratory work are included, as well as instructions for the preparation of assignment cards. The final lesson is devoted to a repetition and to tests. Finally, a bibliography, both for teachers and pupils is provided.

didactics of biology - zoology instruction -
6th class - thematic planning - Arthropoda - USSR.
147307.

423. REBROVA, L.V.:

Tematicheskoe planirovanie uchebnogo materiala po
anatomii, fiziologii i gigiene cheloveka - VIII Klass

(The thematic planning of the teaching syllabus for
human anatomy, physiology and hygiene in the 8th
class)

Biologiya v shkole, 57, 1983, No.3, pp.39-50.

Lit.4.

The thematic planning of the teaching syllabus section which deals with human anatomy, physiology and hygiene assumes a total 68 teaching lessons devoted to the whole course on human biology. The above mentioned subjects cover only the first term of the course. The author defines educational and instructional objectives, teaching media and methods whose use she recommends, as well as references to the textbook used (published in 1982). The first 27 lessons deal with the human motor and support system, blood, blood circulation and respiration. During lessons elementary medical knowledge, including the principles of first aid are taught. Stress is placed on interdisciplinary relations, specifically with chemistry, physics, history and physical education. In conclusion the author provides a bibliography for teachers.

didactics of biology - biology instruction - thematic
plan - 8th class - USSR. 147307.

424. RUBACHEVA, L.I.:

Odin iz variantov tematicheskogo planirovaniya
uchebnogo materiala po obshchey biologii. -

X. klass (One alternative for thematic planning of
the teaching syllabus for general biology in the
10th class)

Biologiya v shkole, 57, 1983, No. 4, pp. 49-56.

This thematic plan continues in the plan for
the 9th class (cf. Blinovskaya, issue No. 4, 1983
of this journal). Here a total of 10 lessons are
analysed concerning general biology. For practical
reasons the author recommends combining lessons into
two-lesson periods for some topics. Laboratory work
is carried out immediately after the given subject-
-matter is taught and assignments should be given
to pupils with the aid of special cards. The article
describes lessons devoted to the following topics:
"The cell and the individual development of an
organism", which includes the chemistry of the cell
(7 lessons), "The structure and function of the
cell" (6 lessons), "Energy metabolism in
the cell" (7 lessons).

didactics of biology - biology instruction -
general biology - 10th class - thematic planning -
the cell - USSR. 147307.

32.2 Preparation of teachers for instruction, for
teaching lessons and other organisational forms
of biology instruction

425. KARPINCZYK, L.:

Jak rozwijam zainteresowania przyrodnicze

(How I develop an interest in nature)

Biologia w szkole, 36, 1983, No. 5, pp. 303-305.

Lit. 3.

The author points to the importance of phenological observations in developing an interest in nature. In this type of activity pupils learn to observe changes taking place in nature in the course of the year and in individual seasons, they learn to record and then generalize the data they collect and then to draw up calendars of changes which take place in nature on the basis of specific symptoms and signs. This work begins in September and is supplemented on a daily basis. At the beginning of March an excursion to a forest was organized. The class was divided into groups of 5 pupils each for the collection of data. Observations are summed up on an annual basis and conclusion drawn.

didactics of biology - biology instruction -
teaching methods - phenological observations -
data collection - Poland. 147307.

426. VITKOVA, M.:

Integrirane na urochna i izvuklasna rabota s tsel profesionalno orientirane (The integration of class and extracurricula work in biology with the purpose of furthering vocational guidance)
Biologiya i khimiya, 26, 1983, No. 4, pp. 57-59.

Integrating the approach to class and extra-curricula biology provides the author with an opportunity to extend pupils' knowledge of problems connected with agriculture and hence also to influence their future vocational choice. The author uses the following approaches to this problem: 1) She gives pupils assignments on the basis of recommended literature and recommends various specialists in agriculture as consultants for these projects. 2) Together with her pupils she visits various agricultural research stations and similar institutions and encourages pupils to start regular cooperation with their staff. 3) The pupils collect and classify various material pertaining to agriculture. This work has brought very promising results, since many pupils have gained an interest in agriculture and many have chosen it as their future occupation.

didactics of biology - biology instruction -
organisational forms of instruction - vocational
guidance - agriculture - Bulgaria. 147307.

12.21 Preparations for botany instruction

427. RANDES, D.:

Stadtvegetation als Unterrichtsgegenstand

(Urban vegetation as a topic of instruction)

Zeitschrift für Naturwissenschaften - Biologie, 32, 1983,
No. 2, pp. 35-55. Lit. 55, 18 figs., 13 tabs.

The author describes how urban flora can be used for the study of ecological problems in school. He describes ruderal plants, trees on city streets and in parks, decorative plants in parks and gardens or courtyards. This type of subject-matter is suitable for the upper classes of secondary school. The author describes the biology of various plant species, their typical representatives and provides a number of suggestions for the study of urban ecology.

didactics of biology - biology instruction - botany instruction - ecological studies - urban environment - plant communities - FRG. 147307.

428. GREENVILLE, H.W.:

Water and plant cells: Notes on a teaching scheme for O-level

Journal of Biological Education, 17, 1983, No. 2,
pp. 159-163. Lit. 7, 2 figs.

The author here describes a teaching project for 13 to 14 year old pupils, based on interdisciplinary relations where use is made of previous knowledge acquired in physics and chemistry. The topic concerns the water regimen of a cell and such

notions as osmosis, diffusion, turgor, water transportation systems in plants and others. The author also provides instructions for carrying out demonstrations in class and experiments for pupils to carry out.

didactics of biology - biology instruction - botany - physiology of plants- interdisciplinary relations - experiments - Great Britain. 147307.

429. HOGGERMANN, C.:

Ein Unterrichtsmodell Nutzpflanzenkunde in der Sekundarstufe II (A teaching model for use in the upper classes of secondary school concerning crop plants)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 10, pp. 321-322. Lit. 5, 3 worksheets.

The author describes a teaching model on crop plants which contain sucrose, oils and fats, plant proteins, as well as those which provide fruits, vegetables, spices and beverages. The motivation-forming for this teaching unit is interesting: The author begins with man's ancestors and describes the purely herbivorous Ramapithecus. Approximately 4 million years ago man's ancestors were divided into herbivorous and carnivorous creatures; the vegetarians became extinct about 2 million years ago, but later hunters again began to use plants as a supplementary source of food. Approximately 10 000 years ago man began to use human and animal excretions as a source of fertilizer and to cultivate crops. Bread is about 6 000 years old.

didactics of biology - biology instruction - botany -
crop plants - history - ancestors of man - FRG.
147307.

430. KUZMINA, I.D.:

Oznakomleniye uchashchikhsya s Prodovolstvennoy
programoy SSSR na urokakh botaniky (Acquainting
pupils with the Food Program of the USSR in botany
lessons)

Biologiya v shkole, 57, 1983, No. 1, pp. 22-25.

An indivisible part of school instruction and a task for all biology teachers is to acquaint pupils with the Food Program of the USSR and to instill in them an active approach to finding solutions to problems facing the country during the construction of socialism. The Food Program was adopted by the Central Committee of the Communist Party of the Soviet Union which met in May 1983. The author describes her own practical experiences with explaining the program to pupils within the framework of botany instruction. She cites the data she included into various topics and describes in detail how data on the Food Program can be integrated into the basic botany teaching syllabus.

didactics of biology - botany instruction - Food
Program of the USSR - food production - USSR.
147307.

431. LACOMBE, G.:

Historie des science et a manuels photosynthèse
et échanges de matière (The history of the natural
sciences and manuals on photosynthesis and metabolism)
Biologie et Géologie, 70, 1983, No. 4, pp. 811-827.
5 tab.

The author discusses problems of photosynthesis and plant metabolism as found in manuals from the first half of the 17th century and specifically as described by the Flemish physician Van Helmont. She draws up tables of a number of scholars, with their dates and brief descriptions of their theories concerning photosynthesis and plant metabolism. She compares and confronts the theories of various scientists with present-day knowledge on these subjects and at the same time demonstrates that the historical method in biology teaching can be very interesting and fruitful for pupils and helps them to understand the continuity which exists in the natural sciences. The author considers historical knowledge a necessary component of the scientific approach and of special importance in the education of the future scientist.

didactics of biology - biology instruction -
botany - history of science - photosynthesis - plant
metabolism - France. 147307.

432. MANNESMANN, R.:

Bakterien und Pilze als Krankheitserreger in unserer täglichen Umwelt (Bacteria and fungi as carriers of disease in our everyday environment)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 6, pp. 181-188. Lit. 8, 1 fig.

The second part of an article which deals with basic information for teachers for use in the course on human hygiene and human biology, which concerns primarily microbial hygiene. Special attention is devoted to the production and preparation of food and how it can be contaminated and to dermatological fungi, modern infections and also droplet infection, periods of incubation, pathogeny, virulence, mykotoxigenic fungi (including the very dangerous aflatoxins) and dermatophytes are explained. Attention is also devoted to dermatological molds, how the skin is attacked by them, how pets should be handled, the alkaline and pH factors in the skin, anatomical characteristics of the skin, damp and wet skin, the dangers of increased exposure to dusty environments, to saunas and swimming pools and to exposure in the course of aquatic sports. Mycosis are found among 10 - 20 % of all children, among students and soldiers these numbers are 20 - 25 %, among athletes 20 - 40 % and among professional swimmers 50 - 100%. The author also discusses the problem of germ carriers.

didactics of biology - human biology - hygiene -
bacteria - molds - fungi - microbiology - FRG.
147307.

433. MARINOVA, M.:

Ispolzuwane na umstvenite operatsii pri izuchavane na temati "list" v peti klas (The utilization of mental operations in teaching the topic "The leaf" in the 5th class)

Biologiya i khimiya, 26, 1983, No. 4, pp. 42-46.

2 tabs.

Such logical operations as analysis, synthesis, comparisons, abstractions, systemization, generalization, etc. are in themselves or in relation to logical forms (notions, judgements, conclusions) the main components of the learning process. Pupils first become acquainted with the main components of analysis and synthesis already in the fourth class, for instance when they learn about the structure and use of a microscope. In the fifth class one of the main requirements which pupils must meet is to be able to identify different plant organs and their components in relation to their function. Such knowledge cannot be learnt in a reliable manner without guiding pupils to analytical and synthesizing operations. When teaching about the leaf, the author recommends beginning with the whole organism and then the distribution of leaves on the plant body and gradually their function on the basis of questions asked by the teacher. First the external structure of the leaf is described (composition, shape, attachment of leaves to stem, leaf veins), and then the internal structure, the shape and structure of cells in the skin and other tissues. Pupils write their findings into tables. Observations and conclusions are based on the handling of original live

material. By discovering the relationship between the whole organism and its parts, between structure and function, cause and effect and on the basis of extending analytical and other mental operations, pupils learn various logical skills and thus develop their intellect capabilities, which is one of the main tasks of contemporary school.

didactics of biology - biology instruction -
botany - logical operations - teacher preparation -
Bulgaria - 147307.

434. MONROE, C.:

Orange Make You Glad / You Teach Botany ? Studying the basic banana and the popular potato will make the botany unit of your biology course a real plus
The Science Teacher, 50, 1983, No. 8, pp. 50-52.
2 photos.

The author describes his experiences in making the teaching of botany an interesting experience for students. He begins by asking what bananas have in common with mules and hinneys - the latter are sterile and they cannot reproduce sexually. Also cultivated bananas do not have seeds, which are found only in wild bananas and banana trees on plantations must be propagated in a vegetative manner. Similarly commercially grown orchids must be artificially pollinated while wild ones are pollinated by insects. When learning about rice growing, the beriberi disease which is caused by vitamin deficiency is discussed. Various interesting problems are described which are connected with the cultivation and use of mushrooms, wheat, oranges

and carnivorous plants. Also a project for making insecticides from plants is described, which is highly motivating for further learning.

didactics of biology - biology instruction - botany - preparation for class - teacher - USA. 147307.

435. MÜLLER, M.:

Das Arbeiten mit Bakterien im Unterricht

(Working with bacteria in school)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 6, pp. 194-105. Lit. 10.

Microbiology is taught within the framework of biology instruction in schools, and also school textbooks to an increasing extent contain chapters on this subject. In spite of this many students still consider bacteria to be only the originators of disease. Bacteria are taught in genetics, in evolution theory, in nutrition, in medical and health care topics, in paleontology and geology, when discussing the technical aspects of bioengineering, in systematics and in biochemistry. A number of interesting experiments and observations can be carried out in school. But anyone handling bacteria should first become acquainted with the Federal Republic law from 18th December 1979 which prohibits disease causing bacteria to be used in schools. But a number of species of bacteria exist which can be used and which can even be acquired commercially, for instance from Santorium GmbH in Göttingen or from other firms cited by the author. In conclusion the author provides a bibliography for teachers on the use of bacteria in schools.

didactics of biology - biology instruction -
microbiology - botany - bacteria + use in schools - FRG.
147307.

436. NIEHAZS, C. - TAAKE, K.H.:

Microorganismen verderben Nahrungsmittel

(Microorganisms spoil food)

Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 6, pp. 189-195. Lit. 8, 1 tab., 3 figs.,
3 experimental assignments.

Food is spoilt by bacteria or molds, and in this process toxins are produced which can be very dangerous. Contamination of food by microorganism is influenced by a number of factors, which pupils should become acquainted with. The author describes experiments which can be done in class and also various species of microorganisms, how they spread, when food is contaminated by them and what diseases are caused by food poisoning. Various toxins are described, the pH of microorganism environments, relative humidity and temperature which they require, etc. The author provides detailed instructions for teaching this subject matter and provides a number of interesting facts from the life of bacteria, for instance about luminescent bacteria, etc. He comes to the conclusion that higher temperatures cause the rapid reproduction of microorganisms and for this reason food should always be stored in refrigerators or freezers. But some bacteria can multiply even under low temperatures and therefore even in a refrigerator food has a limited duration of storage. Especially food rich in proteins, such as meat and fish can most frequently be contaminated.

Freezing does not kill all bacteria. Defrosted food should never be re-frozen because high humidity in the food can lead to the development of molds. Bread should not be kept in completely closed containers or in plastic bags.

didactics of biology - biology instruction - micro-organisms - food - observations - experiments - hygiene - FRG. 147307.

437. RUDOLPH, H.G.:

Die Verbreitung von Samen und Früchten Entwurf einer Unterrichtseinheit für das 5./6. Schuljahr
(The dissemination of seeds and fruit. Suggestions for a teaching unit for the 5th and 6th classes)
Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 8, pp. 266-273. Lit. 18, 2 worksheets, 4 figs., 4 tabs.

Suggestions for a class project on how seeds and fruit are disseminated provide opportunities for independent observations and experiments. The author describes in detail how to carry out morphological observations of seeds and fruit. School instruction can thus contribute to pupils having a correct relationship to botanical objects, to learning how to make factual observations and to think logically while at the same time it teaches pupils to plan their work assignments and to work systematically. The author recommends the use of slides, models and original specimens. The teaching unit is planned for 4 lessons and is described in detail.

didactics of biology - biology instruction -
botany - reproduction - plants - seeds - fruits -
observations - experiments - FRG. 147307.

438. SHUBKINA:

Metodicheskiye rekomendatsii k provedeniyu pervogo
i obobshchayushchikh urokov botaniki v 6. klasse
(Methodological recommendations for teaching the
introductory and generalizing lessons in the botany
course for the 6th class)

Biologiya v shkole, 57, 1983, No. 3, pp. 23-30.

Lit. 3, 2 figs. 3 tabs.

In this methodological recommendation the author stresses the importance of the introductory lessons of the botany course, as well as those which generalize the subject-matter which has been taught and introduce the notion of systematics. When these lessons are properly carried out pupils gain an interest in botany. The recommendations cited in the article have been verified in experimental classes in three different Moscow schools. The outcome of this experimental teaching has led to an increased interest on the part of pupils in botany and to giving larger numbers of independent work assignments. In the introductory lesson, explanations by the teacher and discussions should predominate over practical work. Suitable chosen examples provide opportunities for the formulation of questions, which are then developed in the course of instruction. In the generalizing lessons, pupils' independent work should predominate where pupils are given various assignments, for instance they are asked to explain various factors of plant life, to draw, make surveys,

etc. The teacher should only observe the work closely, make corrections and help in seeking solutions.

didactics of biology - biology instruction - introduction to botany - 6th class - USSR. 147307.

439. SHUBKINA, L.S.:

Odin iz variantov tematiceskogo planirovaniya uchebnogo materiala po botanike. V - VI. klass

(One alternative for the thematic planning of the botany teaching syllabus for the 5th and 6th classes) Biologiya v shkole, 57, 1983, No. 6, pp. 23-40. 4 tabs.

The continuation of an article published in issues Nos. 4 and 5, 1983 of this journal, where the author describes the concept of botany instruction in the 5th and 6th classes. The following topics are cited for the 5th class: The leaf (12 lessons); for the 6th class: Lichens (1 lesson), Bryophyta (2 lessons), Ferns (2 lessons), Horsetails and Club moss (1 lesson), Gymnosperms (2 lessons), Angiosperms (2 lessons). For each lesson the author recommends teaching aids, media, the content and structure of the subject-matter taught, methodological procedures, as well as instructions for drawing up tables and homework assignments.

didactics of biology - biology instruction - botany - basic school - 5th class - 6th class - thematic plan - USSR. 147307.

440. ZAROVNIY, G.M.:

K izucheniya stroeniya semyen i plodov odnodolnikh i dvudolnikh rasteniy - V klass (On studying the structure of seeds and fruits of monocots and dicots in the 5th class)

Biologiya v shkole, 57, 1983, No. 3, pp. 26-28.

1 fig.

Knowledge concerning the structure of seeds and fruits of monocots and dicots is important because only on this basis will pupils understand the phylogeny of plants taught in the 6th class and factors of evolution taught in the 9th class. But a number of problems exist in teaching this topic, especially if only wheat spikes are used in class. The author recommends the use of the bean and describes lessons where both beans and wheat are used. The author also recommends various laboratory projects, teaching for the whole class, the drawing of natural objects, etc.

didactics of biology - biology instruction - botany - monocots - dicots - seeds - fruits - observations - experiments - USSR. 147313.

441. WESTPHAL-NIEBUR, U.:

Wir untersuchen die Verbreitung von Bakterien in der Schule (A study to determine the existence of bacteria in school)

Naturwissenschaft im Unterricht - Biologie, 31, 1983, No. 6, pp. 195-203. Lit. 8, 3 worksheets, 2 photos, 1 tab.

The author describes a 6 lesson thematic unit concerning micro-organisms found in the classroom

environment. Special attention is devoted to the quantitative determinations of infected areas to prove that there are numerous bacteria in all parts of a classroom. From this of course follow various hygienic principles which pupils should follow. This topic can be taught in the 7th class within the framework of the health care course when teaching about bacteria and their morphology. Among the objectives of teaching this subject is also the aim of having pupils realize that only repeated experiments can yield reliable data. The author provides basic factual information for both pupils and teachers: bacteria are found in the air, in droplets as the result of sneezing, coughing, but also speaking, in skin flakes (in classrooms, skin flakes represent up to 70 - 90 % of the dust found there). The presence of an infected person greatly increases the number of bacteria and especially the dangers of such diseases as TBC, whooping cough and tonsillitis are increased. The number of bacteria in classrooms is also influenced by the temperature, humidity, light, texture of the surface of furnishings and the quality and amount of cleaning media used. In conclusion the author supplies various recommendations.

didactics of biology - biology instruction - microbiology - project teaching - observations - experiments - FRG. 147307.

442. ZIMMERMANN, E. - SCHNEIDER, V.:

Bierbrauen im Unterricht. (Beer brewing in school instruction)

Naturwissenschaften im Unterricht - Biologie, 31, 1981, No. 10, pp. 351-359. Lit. 6, 3 worksheets with solutions. 3 figs.

The author describes for teachers the topic "The technical utilization of micro-organisms in beer brewing". The unit is planned for 6 teaching lessons and the final lesson is devoted to an excursion to a beer brewery. The project includes demonstrations and experiments, some of which require several days. In these experiments pupils observe yeast under a microscope, observe alcohol fermentation and provide proof of the creation of carbon dioxide and ^{the} presence of alcohol. During the first lesson pupils observe yeast cells, draw them, describe them and begin an experiment with yeast cells in a sugar solution. In the next lesson human respiration, carbon dioxide and yeast are studied. In the third lesson pupils become acquainted with the manufacture of beer and they line up various pictures of production units and put them into their proper sequence, etc. In the 4th lesson, beer is made in school and the outcome of the preceding experiments are assessed. In the fifth lesson hops are added to the beer made the previous lesson and the presence of alcohol is demonstrated. The sixth lesson is devoted to a visit to a beer brewing plant.

didactics of biology - biology instruction - yeast - beer brewing - planning instruction - FRG. 147307.

443. BROVKINA, E.T. - REZNIKOVA, V.E.:

Odin iz variantov tematiceskogo planirovaniya
uchebnogo materiala po zoologii - VI klass

(One alternative for thematic planning^{of} the zoology
teaching syllabus in the 6th class)

Biologiya v shkole, 57, 1983, No. 2, pp. 21-23.

The authors describe changes which have been introduced into the zoology course in the 6th class. The ideological, polytechnical and nature conservation aspects have been strengthened, and too complex problems, as well as less significant facts have been deleted, while some topics are included only for the purpose of providing a general overview without going into details. More attention is devoted to inter-disciplinary relations. The zoology course has 89 lessons; in the 6th class 21 and in the 7th class 68. Dividing the subject-matter into lessons is left up to the teacher who should take into account the knowledge pupils have and its quality and the teaching aids and other materials available in the biology stock room. The authors provide only recommendations for drawing up such a plan and for using various teaching aids and methods, as well as suggestions for homework and the structuralization of individual lessons. All the topics found in the 6th class zoology syllabus have been included in the plan.

didactics of biology - zoology instruction - 6th
class - basic school - recommendations for planning -
USSR. 147307.

12.22 Preparations for zoology instruction

444. BROVKINA, E.T. - REZNIKOVA, V.Z.:

Odin iz variantov temiach tematicheskogo planirovaniya materiala po zoologii v VII klasse (One alternative for thematic planning of the zoology teaching syllabus for the 7th class)

Biologiya v shkole, 57, 1983, No. 6, pp. 31-38. 4 tabs.

The continuation of an article published in issues Nos. 3 and 5, 1983 of this journal which deals with approaches to teaching zoology in the 7th class. In this article the authors provide recommendations for teaching the classes of reptiles (4 lessons) and birds (14 lessons). For each lesson the required teaching aids are cited as well as the use of methods, logical procedures and suggestions for home-work assignments.

didactics of biology - zoology - instruction -
7th class - basic school - thematic plan - reptiles
- birds - teaching methods - USSR. 147307.

445. HAHN, M.:

Wie nahe darf der Dompteur an den Löwen heran ?
Ein Unterrichtsbeispiel zum Revierverhalten von
Tieren für die 5. bzw. 6. Jahrgangsstufe

(How close can a tamer approach a lion ? Examples
for teaching territorial behaviour of
animals in the 5th and/or 6th class)

Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 4, pp. 131-137. Lit. 3, 1 tab., 4 figs.,
2 transparencies.

The author here discusses basic ethological notions, including territorial behaviour. In captivity the lion at first defends his territory as defined by the circus stockade and only gradually will he allow the tamer to enter his territory. Pupils also learn to understand the behaviour of domestic animals such as dogs and cats or black-birds on the basis of understanding their territorial instincts. Also humans have the remnants of territorial instincts in them: at the beach their blanket defines their territory, they decorate their balconies to distinguish them from those of their neighbors, etc. Dogs define their territory by barking and urinating, the blackbird by singing. Pupils should verify some of these claims.

didactics of biology - zoology instruction -
ethology - territory - FRG. 147307.

446. KHADZHISTEFANOVA, N.:

Rozkrivane na evolyutsionno-ekologichni zakonomernosti pri izuchavane na bezgrbnachni zhivotni v VI klas (Discovering evolutionary and ecological laws in teaching the topic "Invertebrates" in the 6th class)

Biologiya i khimiya, 26, 1983, No. 1, pp. 48-53.

Lit. 7, 1 tab.

In zoology teaching in the 6th class the teacher, when preparing his material, should stress evolutionary and ecological aspects; this knowledge can then be used in subsequent classes by pupils when they study general biology. The author demonstrates such an approach on the basis of the example of the lower invertebrates. She recommends explaining their morphology and physiology as the outcome of adaptation and evolutionary progressive or regressive development. A table sums up her methodological approach, where evolutionary changes are put into the context of ecological changes.

didactics of biology - zoology instruction - evolution - ecology - invertebrates - Bulgaria.
147307.

447. KNOTH, M.:

Soziale Verhaltensweisen bei Tieren unter besonderer
Berücksichtigung des Sozialverhaltens der Ameisen

(The social behaviour of animals with special stress
on the social behaviour of ants)

Der Biologieunterricht, 19, 1983, No. 1, pp. 50-81.

Lit. 25, 3 information sheets, 3 work sheets, 3 figs.

The author discusses methods used for studying the behaviour of ants in nature and in school. The whole thematic unit suggested by the author requires 9 teaching lessons. At the beginning an excursion combined with the collection of suitable material is organized. Subsequent lessons are devoted to a study of social relations in an ant community, how they care for eggs and the young, the aggressiveness of the community and their use of chemical communication (pheromones), as well as their communication when looking for food. *Formica polycetna* and *Formaci rufa* are protected species of ants in the FRG, so that the collection of suitable material must be limited to *Formica pratensis* found in meadows and *Lasius niger* found in gardens, as well as representatives of the genus *Myrmica*. The author also describes how to breed the ants in a plastic vessel and build them an ant hill for observations and experiments; this project is suitable for the upper classes of secondary school.

didactics of biology - zoology instruction -
ethology - insects - observations - experiments -
secondary school - FRG. 147307.

448. KÖNIG, H.:

Die Bekämpfung der Stechmücken (Culicidae) - eine Unterrichtsreihe im Leistungskurs der reformierten Oberschule (Combating mosquitoes (Culicidae) - a thematic unit for the final classes of secondary school)

Praxis der Naturwissenschaft - Biologie, 32, 1983, No. 4, pp. 111 - 119. Lit. 25, 5 worksheets.

The author here describes a thematic unit he himself has taught in the final classes of secondary school, which concerns the combating of mosquitoes. The most important specie found in the Upper Rhineland is *Aedes vexans*, which is very well adapted to the conditions found in this part of Germany. The author describes various methods used to combat these insects; their use always depends on a detailed knowledge of mosquito biology and of the environment in which they are found. He recommends the use of the chemical sold under the tradename Liparol which creates a thin film on the surface of stagnant waters and thus prevents the larvae of the mosquitoes from breathing, so that they die. Also the systematics of mosquitoes are provided, as well as a brief description of their morphology, biology, ecology and the outcome of biological, chemical, mechanical and genetic measures used to combat them.

didactics of biology - zoology instruction -
insects - chemical combat - biological
combat - FRG. 147307.

449. MOLEND, W.:

Brutverhalten (Behaviour towards a clutch)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 2, pp. 37-43. Lit. 8, 2 worksheets.

The author here suggests teaching a thematic unit which deals with the behaviour of birds towards their clutch and how they care for it. This behaviour determines the likelihood of survival of the clutch and thus is directly related to instinctive behaviour aimed at the survival of the specie. It developed in the course of phylogeny from what was originally a strategy to produce a maximum number of offsprings, as in invertebrates. At a higher level of evolution the numbers of eggs were reduced and given greater care, at first on the basis of passive defence and at a still higher level of evolution on the basis of care for the clutch, individual eggs and after hatching, care of the young; this development culminated in an active care of the clutch and the creation of the offspring - parent relationship. The author cites a number of suitable examples and develops the whole thematic unit into individual lessons, for which he cites teaching methods, recommends the use of various teaching aids and also the use of the attached worksheets.

didactics of biology - zoology instruction -
ethology - birds - FRG. 147307.

450. NIKISHOV, A.I.:

Oznakomlenie shkolnikov s resheniyami mayskogo
1982 g. Plenuma CK KPSS na urokakh zoologii

(Acquainting pupils with the documents of the May 1982 plenary session of the Central Committee of the Communist Party of the Soviet Union in zoology lessons)

Biologiya v shkole, 57, 1983, No. 1, pp. 25-28.

At the May 1982 meeting of the CC of the CP of the USSR the Food Program of the USSR was adopted as an important component of plans for improving the living standard of the Soviet people. All citizens should contribute to its fulfillment. Hence one of the current tasks of biology teachers is to acquaint pupils with the importance of the program and thus to contribute to convincing pupils that they should actively participate in carrying it out. The author also specifically discusses how to include data on the Food Program into the zoology syllabus, especially those sections of the Program which concern meat and dairy production.

didactics of biology - zoology instruction -
agriculture - animal husbandry - food program -
USSR. 147307.

451. TAIEB, M.:

Le loup (The wolf)

Biologie - Géologie, 70, 1983, No. 1, pp. 80-90.

Children from all parts of the world, from Cambodia, Morocco, Laos, Tunisia, the Antillies, India, Spain, etc. attend the Maurice Thorez secondary school in Slains. The author, a teacher at

this school, who herself is Tunisian, carried out an interesting experiment. She divided the pupils into groups of three and asked them to write everything they knew on the subject of the wolf. Pupils described the wolf, his hunting territory, way of life, relations to man since Paleolithic times, his social behaviour, reproduction and rearing of young. The place of wolves in folk tales was also described; these tales differed from nation to nation, but in all the wolf played a negative role. During discussions, it was explained that the wolf is harmless and plays a very useful role in the natural environment. The fairy tale of Little Red Ridding Hood is an example of how a fairy tale since early childhood leads children to have a negative attitude towards wolves.

didactics of biology - zoology instruction -
secondary school - mammals - ethology - wolves -
France. 147307.

452. TILLE, R.:

Vorschläge für das Stoffgebiet "Wirbeltiere" in Klasse 5 - unter besonderer Berücksichtigung der Bildung grundlegender Begriffe (Recommendations for the thematic unit "Vertebrates" in the 5th class - with special stress on learning basic notions)

Biologie in der Schule, 32, 1983, No.7/8, pp.308-314.
4 figs., lit.2.

Pupils should learn precise definitions and have an exact understanding of basic notions. It is important for the teacher to understand how to stress certain aspects in the process of learning

basic notions, which will make it easier for pupils to achieve an understanding and then to combine basic notions into an integrated system which can be further extended and developed. For this purpose a theoretical foundation must be created, which in this case can be formed by examples of notion systems which the author describes.

didactics of biology - biology instruction - zoology - notions - learning - GDR. 147307.

453. WESSEL, W.:

Einführung in die Thematik "biologische Schädlingsbekämpfung" mit projektierten Bezügen für die Schulpraxis (An introduction to the topic "Biologically combating pests" with the projection of relations in class work)
Der Biologie Unterricht, 19, 1983, No. 3, pp. 4-9.
Lit. 5.

The author describes biological means of combating insect pests. Insects are an important component of the ecosystem as consumers of plants and as a recycling agent. Among insects are also predators, including scavengers who feed on carrion and parasites. The specie and individual numbers of these insects are huge. Plants protect themselves against herbivorous insects by special substances, which can be produced by man as an insect repellent. The author discusses the phylogeny of insects and the development of individual ecological groups of insects in the course of evolution. He also discusses the problem of forest hygiene in view of the life of insects and the possibilities

of biologically combating insects. He stresses the importance of birds, bats and especially spiders as factors which combat insect pests.

didactics of biology - biology instruction -
zoology - insects - forest economy - biological
combat of pests - FRG. 147307.

454. WYSOKINSKI, J.:

Budowa i środowisko życia owadów. Konspekt lekcji
w klasie V (The body structure and life environment
of insects. An outline for a lesson in the 5th class)
Biologia w szkole, 36, 1983, No. 1, pp. 56-57. Lit. 2,
2 tabs.

The author provides the outline for a 6 lesson unit about the body structure and life environment of insects. The purpose is to acquaint pupils with the external and internal body structure of insects on the basis of the examples of the domestic fly, the cabbage butterfly and the Colorado beetle. In the classroom, both observations and experiments can be carried out. Among the teaching aids which the author recommends are preserved original insects. The first lesson should be devoted to the body structure and life environment of insects, the second lesson to activities of insects, the third to their reproduction and development stages, the fourth and fifth to the social life of insects and the final lesson to a discussion of the significance and place of insects in the environment.

didactics of biology - zoology instruction -
insects - morphology-environment - Poland. 147307.

12.23 Preparations for instruction in human biology

455. BECKMANN, H.:

Mikroben auf der menschlichen Haut (Microbes on the human skin)

Naturwissenschaften im Unterricht - Biology, 31, 1983, No. 6, pp. 212-220. Lit. 12, 2 worksheets, 1 instruction sheet.

The author describes a 4 to 5 lesson teaching unit for the 8th to 10th classes in which pupils study the microorganisms found on the human skin. First pupils are given independent assignments to make smears of the skin and cultivate the organisms found there and then to analyse ^{them} quantitatively and qualitatively. On the basis of an item in the press concerning the large incidence of mold dermatological diseases, a hypothesis is formulated, according to which these microorganisms can become the cause of disease. This hypothesis is then verified on the basis of the qualitative analysis carried out. Stress is placed on the fact that the naturally acid environment of the skin provides natural protection against some forms of micro-organisms. Skin flora includes bacteria, yeast cells, dermatophyte and others. Alkaline soaps tend to destroy natural skin acidity and especially in intimate areas the creation of an alkaline environment is harmful and leads to the proliferation of moulds and fungi. Also clothes made of synthetic yarns have a negative effect because they lead to a softening of the skin and to eczema, as well as skin irritations and positive conditions for fungi.

didactics of biology - human biology instruction -
microorganisms - dermatology - FRG. 147307.

456. BOYADZHIEVA, A.:

Formirane na dialektikomaterialisticheski mirogled
chrez obuchenieto po biologiya v VIII klas

(The forming of a dialectical and materialistic
worldview in the course of teaching biology in
the 8th class)

Biologiya i khimiya, 26, 1983, No. 6, pp. 30-37.

The course on human anatomy, physiology and hygiene follows immediately after the course on botany, zoology and the foundations of ecology and comes before the course on general biology taught in the 9th and 10th classes. In the 8th class the main objective of the course is to provide pupils with an understanding of the organism as an integrated system, whose structure is related to its function, the environment in which it is found and specific self-regulation. The theory of the cell is described in detail, the reflex nature of nerve action, dynamic self-regulation, immunity theory, ontogeny and anthropogeny. In developing the foundation for a dialectical and materialistic understanding and the use of a historical and system approach to the subject matter taught, ideas concerning the material essence of the world and the possibility of studying it, its historical development, the adaptive quality of organisms, the primary nature of the material world and the secondary nature of consciousness as well as the dialectics of biological phenomena should all be stressed. The articles deals in detail

especially with the historical aspects of organisms and their adaptability to the environment, as well as the unity which exists between an organism and its environment and the reflex theory of I.P. Pavlov. Also an explanation of the function of pain and the theory of immunity are provided.

didactics of biology - human biology instruction -
dialectical materialism - worldview education -
Bulgaria. 147307.

457. BRUNOV, E.P. - RUMYANTSEVA, M.N.:

Metodicheskie rekomendatsii k izucheniyu voprosov
gigieny v temakh "Krovoobrashcheniye", "Dykhaniye"
i "Pishchevarenkiye" (Methodological recommendations
for teaching hygiene problems in the topics "Blood
circulation", "Respiration" and "Digestion")
Biologiya v shkole, 57, 1983, No. 1, pp. 39-44.
2 tabs.

To the topics Blood circulation, Respiration and Digestion in the teaching syllabus sections concerning human hygiene have recently been added in the form of an additional lesson at the end of each of these topics. The authors discuss the subject-matter of these additional lessons. They cite specific recommendations concerning interesting points to explain, the use of teaching aids and specific procedures. They also discuss the educational importance of these lessons and their teaching objectives.

didactics of biology - human biology instruction -
hygiene - blood circulation - respiration -
digestion - USSR. 147307.

458. CORCOS, A.:

The Biology of Skin Color

The American Biology Teacher, 45, 1983, No. 2,
pp. 90-95. Lit. 25, 1 tab., 1 photo.

Different skin colors are the most marked indicators of human physical variability. Since time immemorial this has been a subject of curiosity but only recently has this phenomenon been explained in a satisfactory manner and it should also be taught in the schools, in the course on human biology. Differences in skin color are caused by the pigment melanine, which is a very durable brown pigment widely found in plants and animals. In man and other mammals it is synthesized and produced by special cells found among and often under the base cells of the epidermis, called melanocytes. Differences in skin color are not caused by different numbers of melanocytes (which are more or less the same for all humans in terms of numbers of melanocytes per square centimeter of skin), but by their varied activity, determined genetically and by the environment (ultraviolet radiation). The author describes the biology of melanine in detail, as well as the function of melanocytes and melanosomes, different pigmentation of individuals and the relation between skin color and geographical location. This subject-matter is very important for overcoming racial prejudices.

didactics of biology - human biology instruction -
skin biology - skin color - skin pigments - USA.
147307.

459. CORCOS, A.:

Baldness Patterns: Its Genetics Revisited

The American Biology Teacher, 45, 1983, No. 7,
pp. 371-375. Lit. 32, 1 tab., 2 photos.

The author discusses the problem of baldness from the point of view of contemporary genetics. It is caused simply by dominant signs, which appear due to the influence of the ~~male~~ hormone testosterone. A male without the genetic factor of baldness and with an abundance of androgens has normal hair; a man with the genetic factor of baldness and with an abundance of male androgens has typically male baldness; males with the genetic factor of baldness but with a female type of androgene in abundance have normal hair; a man without the baldness factor and with female-type androgens in abundance also has normal hair. A woman who does not have the genetic factor of baldness and has an abundance of female androgens has normal hair, a woman with the genetic factor of baldness and an abundance of female androgens also has normal hair, but a woman with the genetic factor of baldness and with male androgens in medium quantity will have a type of female baldness and a woman with the genetic factor of baldness and male type of androgens in abundance will have a male type baldness.

didactics of biology - biology instruction -
human biology - genetics - sex hormones - baldness -
USA. 147307.

460. DUVALL, D. - FERN, W.A.:

Studies of Animal Behaviour: The State of the Art

The American Biology Teacher, 45, 1983, No. 6,
pp. 305 and 333.

Ethology has caused a revolution in our interpretation of animal behaviour, including the behaviour of man. A new element in these studies is the outcome of combining ethology with ecology and evolution theory. Also the contribution made by sociology is significant. Some elements of behaviour are genetically determined, but because they have developed for very long periods of time in the course of evolution they have changed. They can be found in the gene pools of specific populations. The authors provide a wealth of information from recent publications on ethology. From the point of view of school studies, stress should be placed on why students do a certain thing, not how they do it.

didactics of biology - biology instruction -human
biology - ethology - ecology - evolution - sociology -
USA. 147307.

461. FAHRENBERGER, G.:

Nährstoffe als biologische Energieträger

(Nutrients as biological carriers of energy)

Naturwissenschaft im Unterricht - Biologie, 31,
1983, No. 9, pp. 319-323, 3 tabs., 1 photo.

The author describes school experiments where various foods are analysed to determine their quantitative energy content. Thus pupils learn to understand the term joule and its close relation -

calory.

The significance of food intake by humans is explained, as well as the need for calory equilibrium in food intake. The teaching objective in this topic is to achieve an understanding of the fact that organisms carry out work, but only if they have an energy intake; in contrast to machines they, however, require energy even when they are not working. Animals and man acquire their energy from food. The author stresses the need to use various tables, graphs and other teaching aids, which demonstrate the subject-matter in an ostensive manner. The optimum calory intake of various age categories and for various occupations can be calculated in the course of class work.

didactics of biology - human biology - food -
energy sources - experiments - observations -
optimum food intake - FRG. 147307.

462. FAHRENBERGER, G.:

Tierjungen - Menschenkind: Ein Verhaltensvergleich
(The animal young and the human child - a comparison
in behaviour)

Naturwissenschaften im Unterricht, 31, 1983, No. 2,
pp. 72-83. Lit. 31, 6 figs., 2 worksheets.

On the basis of the grasping reflex, development of posture, imitation, play and behaviour in general, the author demonstrates that it is possible to compare behavioural patterns of animal young and children. Observations of young primates in zoological

gardens, which pupils can also undertake, as well as observations of small children can then be compared during class discussions. It would be a mistake to identify the behaviour of humans and primates. One of the most frequently made mistakes is anthropomorphism - an attempt to explain the behaviour of animals on the basis of human behavioural patterns. The outline of a 7 to 8 lesson teaching unit is provided, together with recommendations for teaching aids and a division of the subject-matter into individual lessons. During the first three lessons a discussion is organized as an introduction to this subject matter, including similarities and differences between humans and primates. In the third and fourth lessons learning and imitation are dealt with and in the remaining lessons the role of play and games. The author also provides texts for pupils, a bibliography, tables, a list of films and 2 worksheets.

didactics of biology - biology instruction - human biology - primates - man - behavioural patterns - FRG. 147307.

463. GURLEY, L.:

Human Postural Signals

The American Biology Teacher, 45, 1983, No. 6, pp.355-356.
4 photos.

The author provides information on very interesting work based on observations of human behaviour and specifically of postural signals in various situations. Thus for instance when standing and talking a person will have a different

posture depending on whether the communication concerns a brief encounter, preparing to finish the conversation and leave, whether the speaker is a man or woman and what is the relationship towards the person spoken to. Human postural signals are an interesting subject of study since they provide information on adaptive patterns of behaviour and on non-verbal communication among people.

didactics of biology - biology instruction - human biology - behavioural patterns - non-verbal communication - USA. 147307.

464. HAINZ, M.R.:

Verhaltensbiologie. Aspekte zum Sport (Ethological aspects of sports)

Praxis der Naturwissenschaften - Biologie, 32, 1983. No. 10, pp. 312-320. Lit. 17, 2 worksheets, 1 transparency, 4 figs.

The author discusses human behaviour and sports. He stresses the significance of sports for humans, which include a safety valve for aggressive behaviour. Different sports have a different effect in this context, some lead to a easing of aggressive tensions, while other sports tend to increase aggressiveness. Young animals play only when their other requirements have been satisfied and play leads to an easing of tension, thereby fulfilling a specific biological function. In sports, however, aggressive behaviour is often an important component, so that it is often doubtful whether sports serve education for peace or for war, whether they make a contribution to the development of mankind or conversely are a re-

tarding factor. The author's discussion of this topic is very interesting and he convincingly shows that at least some sports are more negative than positive in their impact.

didactics of biology - biology instruction - human biology - sports - human behaviour - FRG. 14/307.

465. ⁵HÖGERMANN, C.:

Methode zur Erstellung eines geordneten Karyograms menschlicher Chromosomen (Jahrgangsstufe 11)

(A method for making ordered karyograms of human chromosomes - for the 11th class)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 1, pp. 29-31, 1 fig.

The author describes an assignment which pupils can carry out as an independent project and which allows them to become acquainted with a human karyogram. This subject-matter belongs among the basic topics of the genetics syllabus and enables pupils to become acquainted with a normal karyogram and then with chromosomal aberrations and the diseases they may cause (for instance Down's syndrome, the Klinefelter syndrome, etc.). The author recommends the use of slides to show normal human chromosomes, the pupils copy them and then draw an ordered karyogram from the 1st to the 23rd pair of chromosomes.

didactics of biology - human biology - genetics - chromosomes - chromosomal aberrations - hereditary disease - FRG. 147307.

466. JAE, I.:

Phänomen Schmerz (The phenomenon of pain)

Praxis der Naturwissenschaften - Biologie, 32, 1983,
No. 6, pp. 165-178, Lit. 75, 12 figs.

The author describes the physiology of pain, its development, characteristics and attempts to quantify it. He also provides a definition of pain and describes its perception by specific receptors, how the irritation of nerves takes place and the possibility of the body disconnecting the sensation of pain by its own means, with so called neuropeptides which were first discovered in 1975. Among these neuropeptides are endorphines and ankaphelines, which have an effect on the body similar to morphium. Pain is considered to be an alarm system which warns of the existence of disease or other threats to the human body.

didactics of biology - human biology - physiology -
nerve system - pain - FRG. 147307.

467. LEUCHTENSTERN, H.:

Drogenpflanzen - Pflanzendrogen - aus dem Drogen-
almanach (Plants which yield drugs and drugs made
of plants, from the Drugs Yearbook)

Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 11, pp. 380-382. Lit. 8, 8 figs.

The author describes how during a single teaching lesson he dealt with the most important plants which yield various drugs. He provides a survey of their species and acquaints readers with their physiological and medicinal properties. He mentions *Amanita muscaria*

from which muscarin and muscinol are made, *Claviceps purpurea* from which lysergic acid for LSD is made, *Cannabis sativa*, var. *Indica* from which marihuana and hashish are made, *Lophophora williamsi* - contains mescaline, *Psilocybe mexicana* - from which psilocybin and psilocin are made and finally *Erytoxylon coca* from which cocain is made.

didactics of biology - biology instruction - botany - plants containing drugs - hallucogenic drugs - FRG. 147307.

468. LICHTNECKERT, H.:

Zwischen Droge und Genusmittel - Der Kaffee als legale Droge (Something between a drug and an eatable - coffee as a legal drug)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 11, pp. 383-386. Lit. 2, 2 tabs., 3 figs.

The author provides the outline of a teaching unit for secondary school pupils on the use of a legal drug - coffee. He describes the effects of coffee drinking which produces its own problems. Pupils become acquainted with the effects of coffee^{which} has a negative effect on health. But also some of the positive aspects of coffee drinking are mentioned, so that pupils in the course of discussions can form their own rational attitude to coffee drinking. The regular and frequent drinking of coffee makes a person nervous, causes accelerated heart beat, stomach and intestine problems, problems with falling asleep and also coffee drinking can become addictive. Among its positive influences are a better mood, becoming more alert, accumulating more nervous energy and creating a lively and amusing atmosphere among people.

didactics of biology - biology instruction - human
biology - eatables - coffee - health care - FRG.
147307.

469. LINTZMAYER, H.:

Genuß mit Reue. Physiologische Wirkung psychoaktiver
Drogen: Opium, Haschisch, Halluzinogene (Pleasure
with pain. The physiological effects of psychoactive
drugs: opiates, hashish and hallucinogenic substances)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 11, pp. 397-406.

The author provides a detailed outline of a
thematic unit on drugs and their physiological effects.
He concentrates on opiates, hashish and hallucinogenic
drugs. For motivation the author quotes drug addicts
and their experiences and the main effects of these
drugs. The most important part of the outline is
devoted to the effect of drugs on the human brain
and on the biochemical and physiological mechanism
of the human body and how addiction is formed. Also
the effect of drugs on the mind are describes, their
effect on the digestive system and generally on neuro-
physiological processes in the body. The outline is
divided into individual lessons; the aim is to warn
pupils against the use of drugs.

didactics of biology - biology instruction - human
biology - drugs - hallucinogenic substances - drug
addiction - FRG. 147307.

470. MANNESMANN, R.:

Hygiene als Unterrichtsthema in der Sekundarstufe I.
(Hygiene as a teaching subject in the lower classes
of secondary school)

Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 6, pp. 179-181.

The author explains why the subject of hygiene has been chosen as the subject-matter for a whole issue of this journal. Articles deal with various epidemiological problems encountered by man. Stress is placed on experiments and microbiological observations and experiments are suggested, with stress on bacteria and fungi. The author provides a definition of hygiene and its objectives as a school teaching subject. If hygiene teaching is to be interesting it should not only be theoretical but also experimental and provide opportunities for independent work by pupils. Individual lessons are described in detail.

didactics of biology - human biology instruction -
hygiene - microbiology - observations - experiments -
FRG. 147307.

471. MANNESMANN, R.:

Über das Händewaschen (On hand washing)

Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 6, pp. 208-212. Lit. 1, 2 worksheets, 3 figs.

The author provides the outline of a 2 to 3 lesson teaching unit which he recommends for the 7th class, concerning health care education, specifically the problem of dirty hands. A demonstration of the transmission of disease-forming bacteria by dirty

hands or hands which have been washed insufficiently can be very convincing. The number of microorganisms found on hands is directly related to the duration and intensity of hand washing and the cleanliness of the towel used. Also the quality of the soap is important. The author also describes the importance of interrupting chains of infection and the role which clean hands play in the prevention of some diseases (hepatitis).

didactics of biology - biology instruction - human biology - hygiene - cleanliness - FRG. 147307.

472. MENZDORF, A.:

Aggressivität und Aggression (Aggressiveness and aggression)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 8, pp. 238-243. Lit. 59.

The author discusses aggressivity and aggression from the point of view of ethology. He divides aggression into two basic groups: interspecific and intraspecific. In the former different species struggle, while in the latter a struggle is carried on between members of a specific species; one type does not follow from the other. Among the majority of herbivores, interspecific aggression is greatly reduced, but the degree of intraspecific aggression is very high. The author discusses both aggressiveness and aggression in detail and stresses the importance of learning the cause of aggressive behaviour and the possibility of avoiding conflicts.

didactics of biology - human biology - ethology - aggressiveness - aggression - herbivorous - FRG. 147307.

473. MENZDORF, A.:

Arbeitsmaterialien für die Behandlung des Themas
"Aggression beim Menschen" im Unterricht (Work material
for use in teaching the topic "Human aggression")
Praxis der Naturwissenschaften - Biologie, 32, 1983,
No. 8, pp. 243-252. Lit. 13, 6 figs., 2 tabs.,
3 worksheets.

The author compares the behaviour of humans and animals on the basis of the example of laughter and mockery. Mockery can lead to aggression. He also discusses the problem of population density and its influence upon aggression. Statistics of criminal acts indicate that areas with high population density have a higher crime rate than other areas. Especially intraspecific aggression tends to grow with increasing population density.

didactics of biology - human biology - ethology -
aggression - population density - human populations-
FRG. 147307.

474. MEYER, A. - STRAUSS, W.:

Partnerschaft beim Menschen. Unterrichtsmodell für
ein 9. Schuljahr. (Partnerships among people. The
outline of a teaching project for the 9th class)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 3, pp. 419-423. 7 appendixes.

The authors describe the findings of their research on the creation of partnership relations among the sexes and people in general. Part of the research was carried out among pupils on the basis of interviews and other forms of communication,

and concerned the creation, course, existence and decline of partnership relations among pupils. The project was conceived as an ethological study, whose purpose was the collection of data which could subsequently be used for comparisons between animal and human behaviour. Among the subjects studied were offers of contacts, reactions to offers, links between partners, the function of partnerships, their end, arguments among partners, divorces, death, etc. Examples were chosen from fiction and poetry as well as other arts.

didactics of biology - biology instruction - human biology - ethology - partnerships + humans - FRG.
147307.

475. MILUSHEVA, E.:

Intensifikatsiya na uchebniya proces chres upravlenieto mu po freke na uroka "Slukhov analizator"

(The intensification of the learning process in a lesson devoted to the topic "Hearing analyser")
Biologiya i khimiya, 26, 1983, No. 2, pp. 34-38.
4 drawings.

Making the learning process more intensive assumes better preparations on the part of the teacher for the teaching lesson and seeking such forms of teaching which require a minimum of energy and time while yielding maximum results. The author demonstrates this on the basis of the example of a lesson concerning hearing analysers. The author begins the lesson by asking pupils to describe various parts of sight analysers which they know and to explain how the

sight analysis receptor is separated from supplementary parts of the eye. In order to understand the function of the external and inner ear the author uses an outline on which pupils draw the relevant parts of the ear, according to the textbook. The principle of hearing is derived from the model of an ear in direct confrontation with pupils' own experiences.

didactics of biology - biology instruction - Human biology - hearing - ear - Bulgaria. 147307.

476. MOLENDI, W.:

Das Kindchenschema (The outline of a child)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 2, pp. 60-71.
Lit. 11, 7 figs., 6 worksheets

The author provides suggestions for a 5 to 6 lesson thematic unit which can be taught in the 7th to 8th or 9th to 10th classes. He provides factual information on the outline of a child which concern the main characteristics of a child, the behaviour of adults towards children, the mother-child relationship, contacts with a child, etc. On this basis he offers a biological outline of a child. He also discusses the use of the image of a child in advertising, toy designs and various pictures.

didactics of biology - human biology - children - ethology - FRG. 147307.

477. MOLENDI, W.:

Mutter - Kind - Beziehung (The mother and child relationship)

Naturwissenschaften im Unterricht - Biologie, 21,
1983, No. 2, pp.43-51. Lit. 21, 5 figs.,
3 information sheets.

On the basis of observations in zoological gardens, films and on the basis of various written descriptions the author sums up the most important characteristics of the mother-child relationship in primates and in man. The second part of the article describes experiments carried out by Harlow concerning a breakdown of the mother-child relationship and deprivation syndromes in children, especially in child care institutions. The final part of the article discusses possibilities for preventing deprivation syndromes in children. The information sheets sum up experiments and observations carried out with various species of primates by Harlow. Also the author's suggestions for preventing deprivation in children in the home, school, and in society as a whole are interesting.

didactics of biology - human biology - ethology -
mother and child relationship - deprivation
syndrome - FRG. 147307.

478. MOLENDI, W.:

Zum Unterricht über Tierjunge und Menschenkind
(On teaching about animal young and the human child)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 2, pp. 35-37. Lit. 4, 2 photos.

Psychology, ethology and pediatrics have so far not devoted sufficient attention to the needs of small children, infants and toddlers. A number of traditions, as well as incorrect attitudes towards children still survive. Neither parents or nurses have sufficient knowledge of the reactions of infants to various stimuli. Politicians have created situations where mothers must go to work and so young children are sent to nurseries and kindergartens and hence deprivation syndromes are more frequent. In the FRG the legal duration of maternity leave is only 6 months. Women should struggle for their rights, including the protection of pregnant women and women who are mothers of small children. The consequences of incorrect rearing can have long-term effects which are difficult to overcome. For the author these arguments provide motivation for a teaching project on the mother - child relationship among primates (on the basis of observations in a zoo) and in man. He provides instructions for organizing a visit to the zoo and also recommends the screening of films. The project is suitable for the lower classes of secondary school.

didactics of biology - human biology - education of small children - deprivation - ethology - Zoo observations - FRG. 147307.

479. NEUMANN, G.H.:

Der menschliche Säugling als Tragling - Fakten, Bedeutung, Arbeitsmaterial für den Unterricht (The human infant as a specie whose young must be carried - facts, significances, work material for classwork) Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 8, pp. 253-259. Lit. 3, 10 figs., 2 accompanying texts.

The young in the animal world can be divided into those that feed themselves or those which must be fed; those that stay in the nest with closed eyes and ears are fed by their parents and those that leave the nest and seek their own food under the surveillance of their parents. The author compares these feeding patterns with the feeding patterns found in young primates and in human infants. In primates the young remain on the body of their mothers or other adult primates and are carried about by them. The eyes and ears of young primates are open and they have hair, and they hold on to their mothers with their own force. There is much to suggest that human infants also basically conform to this pattern, babies also have at least remnants of a grasping reflex both in hands and feet. This should be kept in mind when dealing with human babies.

didactics of biology - biology instruction - human biology - ethology - primates - infants - PRG. 147307.

480. NEUMANN, G.H.:

Was heisst und was bedeutet "angeboren" im menschlichen Verhalten ? (What does "inborn" in human behaviour mean and what is designated by this term ?) Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 5, pp. 229-238. Lit. 23, 4 tabs., 7 figs.

The author describes inborn components of human behaviour which are not always in harmony with a civilized environment. Contemporary man, even in a highly civilized environment is not an exclusively cultural being but also has important biological attributes which are genetically determined. 99 % of the history of mankind, before the introduction of writing, proceeded very slowly and 99 % of the history of man has been taken up by the time when man was a hunter and collector of food. During this time infant mortality was very high, but each child had the opportunity to make social contacts and to individualization. The division of labour was based mostly on the division between men and women. The men hunted and the women took care of the children and collected plants. But even in such small groups of people aggression existed, a non-aggressive human never existed. The author continues by describing the development of mankind since the discovery of writing and the beginnings of agriculture, the cultivation of plants and animal husbandry. Previously, technical progress took place very slowly while today it has greatly accelerated. The first great population explosion took place about 400 years ago, between 1800 and 1960 the population on Earth increased fourfold. In 1980 there were 26 cities with over 5 million in-

habitants, of which 16 were in the developing countries. In 2000 it is assumed that 8 out of 10 population centres will be in the developing countries. At present 29 % of the world's population lives in urban centres and by 2000 this number is assumed to be 41 %. The author provides the outline of a teaching unit concerning the natural and cultural limitations of man, his inborn behaviour, the relation of the infant to the person who cares for him, territorial behaviour and aggressive behaviour, etc. In classwork, stress should be placed on ethological methods and the methods with which behavioural patterns can be studies.

didactics of biology - biology instruction - Human biology - behavioural patterns - ethology - forecasting - history. FRG. 147307.

481. POSCHARDT, D.:

Sociologische und psychologische Aspekte des Drogenkonsums (The sociological and psychological aspects of drug consumption)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 11, pp. 373-379. Lit. 21, 2 figs., 8 tabs.

The author asks what the causes and conditions of increased drug and tobacco consumption are. He first explains basic terms concerning drugs and their addiction and on the basis of a theoretical model attempts to define practical aspects of the problem. One of the main problems is the variability of the social field and of social and cultural conditions. The author attempts to indicate the influence of various factors in drug-related behaviour, and

describes the findings of empirical studies. The article specifically cites interpersonal relations as a cause of drug addiction. The article provides teachers with the most up-to-date information on this subject.

didactics of biology - biology instruction - human biology - health-care education - drug addiction - prevention - FRG. 147307.

482. RHINE, S.A.:

The Most Important Nine Months

The Science Teacher, 50, 1983, No. 7, pp. 46-51.

The majority of neonate defects are the outcome of problems which have appeared in the course of pregnancy. The author here provides the outline of a teaching unit (for 3 lessons) concerning pregnancy. The purpose of this teaching unit is to provide students with information which will make it possible to prevent defective neonates, whose number is increasing. In the USA one in twenty children are born with some kind of defect. In the developed countries 3 % of the children born are mentally retarded. Among the most important physical handicaps with which children are born are deafness, blindness, cleft palate, club foot and spina bifida. Some neonate defects are genetic and caused by the intermarriage of relatives, by the too high age of the parents and disease in pregnant women accompanied by high temperatures; also diabetics tend to have defective children and the descendants of ancestors from Ireland, Scotland, England and Wales in the USA are more likely to have spina bifida than the descendants of other

nationalities. The author describes the course of pregnancy in detail, the importance of regular physical examinations, correct nutrition, not taking any drugs, not smoking, avoiding X-rays, not drinking coffee, alkaloids and avoiding infections. Especially very young or older women are in danger, as well as women having their first child, those suffering from diabetes, high blood pressure, heart disease, sickle-cell anemia, convulsions, mothers who have had twins, mothers with placenta problems, those whose embryo is in an incorrect position, those who have small pelvises and those who have undergone bouts of venereal disease.

didactics of biology - biology instruction - Human biology - pregnancy - birth defects - prevention - ZSA. 147307.

483. RASHKOVA, S. - VASILEV, V.:

Intelektualizatsiya na uchebnata deynost na uchebnitsite po biologiya v deseti klas (The intellectualization of learning activities of pupils in the biology course of the tenth class)

Biologiya i khimiya, 26, 1983, No. 2, pp. 29-34. 1 tab.

At present greater demands are made of pupils, especially regarding the independence of their work, initiative and logical thinking. The authors provide the outline of a teaching topic called "Aging and death" and on its basis demonstrate how the above mentioned demands can be met. They first discuss the duration of life of plants, animals and man, symptoms of aging from a morphological and physiological point of view, the theory of aging, the essence

of death, regeneration, factors contributing to longevity and attempts to rejuvenate people. The subject-matter is dealt with in a problem manner and the lessons are in the form of seminars. The article also contains table which provides a survey of the highest attainable ages achieved by various organisms.

didactics of biology - biology instruction - physiology - aging - death - Bulgaria. 147307.

484. REEROVA, L.V.:

Tematicheskoe planirovaniya uchebnogo materiala po anatomii, fiziologii i gigiene cheloveka - VIII klass
(The thematic planning of the section of the teaching syllabus pertaining to human anatomy, physiology and hygiene in the 8th class)

Biologiya v shkole, 57, 1983, No. 6, pp. 39-45. 5 tabs.

The continuation of an article published in issue No. 3, 1983 of this journal which analyses the concept of teaching anatomy, physiology and hygiene in the 8th class. Here the author concentrates on the topics "Digestion" (6 lessons), "Metabolism" (6 lessons), "Excretion" (2 lessons), "The skin" (4 lessons). For each lesson the author recommends various teaching aids, the structure and content of the subject-matter, suitable teaching methods, logical approaches and homework assignments.

didactics of biology - biology instruction - human biology - thematic plan - teaching lesson - 8th class - anatomy - physiology - hygiene - USSR. 147307.

485. SCHMIDT, L.:

Alkoholismus - ein Problem für uns alle. Materialien zum Thema Alkohol (Alcoholism - a problem for us all. Material for a study of alcohol)
Naturwissenschaften im Unterricht, 31, 1983, No. 11, pp. 411-415. and 423. 6 figs., 1 worksheet.

One of the most important social problems of Europe at present is alcoholism. The author deals with this problem in detail. He divides alcoholics into 4 groups - the first deals with problems of drinking from one case to the next, a second group drinks out of habit, a third group drinks intensively with a loss of control and the symptoms of disease, while the fourth group are full alcoholics, who feel ill when the level of alcohol in their blood declines. The author stresses that people should not be ashamed of being ill; what one should be ashamed of is when nothing is done about a drinking problem. Making alcoholism a secret is very dangerous and can end in death. Acute alcoholics end up with hallucinations, blindness and death.

Didactics of biology - biology instruction - human biology - alcoholism - FRG. 147307.

486. ŠMERDA, J.:

Genetické poradenství (Genetic counselling)
Přírodní vědy ve škole, 34, 1982-1983, No. 6, pp.207-209.
Lit. 2.

The development of human genetics as a science has made it possible to decrease the number of hereditary disease in the population. Modern medical genetics are capable of predicting the propensity of

individuals to develop a specific hereditary disease. Genetic counselling services have in recent years been greatly developed and can now carry out the prenatal diagnostics of hereditary disease. Their purpose is to prevent the transmission to further generations of genotype disease factors which determine pathological phenotypes. This is in fact genetic prevention. Regional hospitals now have genetics departments or clinics which provide counselling for the population. All hereditary and inborn disease existing in the catchment area are registered here, the clinics carry out education in this area and also genetic and clinical research. The author also describes various methods used to determine hereditary risks and measures taken to prevent the birth of faulty individuals.

didactics of biology - biology instruction - human biology - genetics - genetic counselling - prenatal diagnostics - hereditary disease - Czechoslovakia. 147307.

487. TENDEL, J.:

Drogen - Drogenprävention. Zum Konzept des Themenheftes
(Drugs and the prevention of drug addiction. The concept of a thematic issue)
Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 11, pp. 367-372. Lit. 5, 2 figs., 1 tab.

The author explains why the editors have decided to publish a special issue devoted to problems of drugs and drug addiction prevention. He discusses various aspects of this problem, especially the social and psychological. He discusses plants which yield

drugs and medicinal herbs, stresses the role of the teacher in the prevention of drug use and discusses seemingly innocent drugs such as tobacco and coffee, as well as those which pose a threat to life, such as heroin. He points to prejudices which exist in this area, the problem of parental attitudes to drugs, school and drugs, etc. Some of the arguments which the author has heard from pupils in defence of drugs are cited and how they were discussed with his pupils.

didactics of biology - biology instruction - human biology - drugs - prevention of addiction - PRG. 147307.

488. WELLS, J.:

Human hair: an educational tool

Journal of Biological Education, 17, 1983, No. 3, pp. 185-186. Lit. 8, 2 figs.

The author describes some new methods of using human hair in classwork. He describes the structure, growth and division of hair and the differentiation of cells in hair. Hair can be studied both in situ and in vitro, for the observation of chromosomes, and for the cultivation of epithelial cells. The author divides hair into three categories: hair in the inactive stage, in the active growth stage and in the fully active growth stage. He provides detailed instructions for using hair in classwork and how to cultivate hair in vitro.

didactics of biology - biology instruction - Human biology - skin - hair - observations - experiments - cultivation - ZSA. 147307.

12.24 Preparations for instruction in general biology, genetics, ecology, molecular biology, ethology and the history of biology

489. AXEROYD, F.M.:

Teaching the Krebs Cycle

Journal of Biological Education, 17, 1983, No. 3, pp. 245-246. 1 fig.

The author describes how to go about teaching such a relatively complicated physiological phenomenon as the Krebs cycle. This didactically complicated task is here analysed and simplified, the author explains individual steps in explaining the problem; for use in secondary schools.

didactics of biology - biology instruction - molecular biology - Krebs cycle - Great Britain - 147307.

490. ALEKSANDROVA, I.:

Integralen podkhod v uroka "Pregled na obmenite protsesi" ot kursa po biologiya za desati klas

(An integrated approach to a lesson on "A survey of metabolic processes" in the tenth class biology course) Biologiya i khimiya, 26, 1983, No. 4, pp. 20-25.

The comprehensive development of the personality requires an integrated approach to teaching. The 10th class biology course provides a number of opportunities for such an approach. In the lesson devoted to metabolic processes the author sets the following objectives: to derive the general laws of living and non-living nature, document the unity of living and non-living

nature and the causes of the existence of their continuous mutual contradictions, the qualitative distinction between metabolic process and process occurring in non-living nature, proof of the unity which exists in varied metabolic processes and the development of various metabolic forms. The author discusses each of these aspects and cites questions which can be given to pupils.

didactics of biology - biology instruction - general biology - metabolic processes - living and non-living nature - 10th class - Bulgaria. 147307.

491. BILSING, A.:

Verhaltensbiologie im Biologieunterricht ?

(Ethology in biology courses ?)

Biologie in der Schule, 32, 1983, No. 11, pp. 435-439.
1 fig.

A great deal of attention is at present devoted to ethology, which has already successfully explained various behavioural patterns in animals and which is also becoming a useful tool in animal husbandry. Ethological problems in the biology course tend to have a strongly motivating influence. The teaching syllabi for biology in the 5th to 10th classes devote a great deal of attention to material and energy relations among organisms, but much less attention to information relations, which are the domain of ethology. These information aspects are the subject-matter of ethology and should be strengthened.

didactics of biology - biology instruction - general biology - ethology - teaching syllabus - GDR. 147307.

492. BLINOVSKAYA, Y.V.:

Odin iz variantov raspredeleniya uchebnogo materiala po obshchey biologii - IX klass (One alternative for dividing the general biology teaching syllabus into lessons in the 9th class)

Biologiya v shkole, 57, 1983, No. 6, pp. 45-48.

The continuation of an article published in issue No. 4, of this journal (1983) which concentrates on the topic "The development of organisms" (9 lessons). The author cites teaching media for each lesson, as well as its structure and content, logical procedures and homework.

didactics of biology - biology instruction - general biology - thematic plan - 9th class - evolution - USSR. 147307.

493. BLUME, D.:

Nahrungsketten und Nahrungsnetze (Food chains and food networks)

Naturwissenschaften im Unterricht, 31, 1983, No. 9, pp. 298-303.

The author here describes a thematic unit on food chains and food networks; its objective is to achieve an understanding of how food chains are formed by various organisms which are mutually dependent on each other for their food. Food networks are the outcome of combining food chains. In these chains and networks, nutrients are passed on from one component to the next. All are founded on green plants which are primary producers, then continue in herbivores who are consumers of the 2nd and 3rd order . The

author demonstrates the consequences of a breakdown in food chains or networks as a consequence of the use of pesticides. The thematic unit is analysed from a didactical point of view, on the basis of the example of a forest community.

didactics of biology - biology instruction - general biology - food chains - food networks - ecology - forest community - FRG. 147307.

494. BLUME, D.:

Stoffkreisläufe (The circulation of matter)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 9, pp. 304-311. Lit. 3, 3 picture tables,
3 worksheets, 8 texts.

The author demonstrates how, on the basis of discussions with pupils and with the aid of suitable transparencies, he is able to demonstrate various ecological phenomena, including food chains and food networks, as well as explain another important component of the circulation of matter in nature - reducers, small organisms which mineralize the dead bodies of organisms and thus return mineral substances to the environment where they are then at the disposal of green plants. He also demonstrates the consequences of a breakdown in some food chains and networks upon the whole natural community; the community may overcome the breakdown, but it may also lead to a breakdown of the whole.

didactics of biology - biology instruction - ecology - food chains - food networks - reducers - circulation of matter - FRG. 147307.

495. BOJUNGA, W.:

Abbauprozesse in natürlichen Boden (Disintegration processes taking place in the soil)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 9, pp. 292-297. Lit. 3, 2 figs., 3 tables,
2 worksheets.

The author first explains the reasons for including this subject-matter into classwork and also explains why various aspects of forestry economies have been made into laws and government administered regulations. On the basis of an excursion to a forest and subsequent laboratory work pupils can become acquainted with the mineral content of the soil in deciduous forests and how various microorganisms create conditions for the mineralization of plant material. Pupils then become acquainted with these microorganisms, the circulation of matter and the role of the soil in this circulation. A deciduous forest provides the best example for such classwork, because the soil in such forests is very rich in microorganisms. But in the Federal Republic, to carry out such a project requires the permission of the relevant administration. The author provides a list of various instruments and aids which are required and the experiments which can be done with the soil samples. On a hectare of forest the author calculates that 1 000 kilograms of soil bacteria are found. Leaves are disintegrated during two years and entirely mineralized in the course of 6 years, while a tree stump takes 12 to 15 years to be mineralized.

didactics of biology - biology instruction - ecology -
reducers - mineralization - forest soil - FRG. 147307.

496. DOHUNGA, W.:

Zum Ökologie-Unterricht auf der Sekundarstufe I.
(Concerning ecology. Teaching in the lower classes
of secondary school)
Naturwissenschaften im Unterricht - Biologie, 31,
1983, No. 9, pp. 291-292.

The author offers comments on the teaching syllabus and classwork done in biology on its basis concerning ecology in the lower classes of secondary school. He points out that the basic subject-matter in ecology should be carefully chosen so that basic terms and notions are correctly learnt, which can then be extended but not corrected during subsequent instruction. He suggests the following sequence of learnings: adaptation of organisms to the environment - ecosystems and their energy equilibrium - the principle of matter circulation and energy flows - biocenotic equilibrium and in the final integrating topic of unit, the landscape in the hands of humans.

didactics of biology - biology instruction - ecology -
lower classes of secondary school - sequence of topics-
FRG. 147307.

497. BORDSON, B.L. - BENNETT, J.W.:

Down Syndrome: presentation in current genetics textbooks
Journal of Biological Education, 17, 1983, No. 3,
pp. 251-256. Lit. 54, 1 tab.

Down's syndrome is often used in textbooks on genetics at colleges and secondary schools as an example of an anomaly in human cytogenetics. The

article discusses various interpretations of Down's syndrome in the textbooks currently in use and sums up various data which is not in accord with the latest medical developments. The authors then explain Down's syndrome on the basis of the most recent research and recommend its inclusion into explanations of this disease in school.

didactics of biology - biology instruction - genetics - human biology - Down's syndrome - updating textbooks - USA. 147307.

498. DANCKWERTS, R. - VOGEL, D.:

Panmixie und ihre Folgen (Panmixie and its consequences)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 6, pp. 178-182. Lit. 2, 9 figs.

The authors demonstrate the usefulness of mathematical methods and their correct biological interpretation on the basis of the Hardy-Weinberg law of population genetics. On the basis of a practical example they ^{explain} changes in gene pool composition in a specific population which takes place in the case of panmixie in the following F_1 generation.

didactics of biology - biology instruction - genetics - general biology - ecology - Hardy-Weinberg law - panmixie - FRG. 147307.

499. FALKENHAUSEN, B.:

Ökosystem Wald - Skizze einer Unterrichtseinheit

(The forest as a ecosystem - the outline of a thematic teaching unit)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 6, pp. 182-185. Lit. 18.

The author here provides the outline of a teaching unit concerning the forest as an ecosystem. The specific forests found in Olper Holz and Timmlaher Bucht are used for examples, but the outline is practically useable anywhere else just as well. The teaching unit is intended for the upper classes of general education secondary school. Among the specific topics concerning the forest included are the structure of the forest and a forest biota, the history of the forests, the circulation of matter in the forest, energy flows in the forest, a forest biocoenoses, current threats to the forest. The author stresses the need to distinguish mono-causal and system thinking when teaching this topic.

didactics of biology - biology instruction - ecology - ecosystems - forests - FRG. 147307.

500. FISCHER, P.E.:

Gene, Nerven und Verhalten (Genes, nerves and behaviour)

Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 1, pp. 1 - 11.

The article provides the most up to date information on the findings of genetic research concerning neurophysiology and ethology. The theory explains, on the basis of the specific examples of bacteria,

protozoa, the drosophila fly and roudworms, the relation between genes and the behavioural patterns of these animals.

didactics of biology - biology instruction - genetics -
- ethology - behavioural patterns -PRG. 147307

501. PRYNE, M.:

The Use of Cat Genetics in School

The School Science Review, 65, 1983, No. 231, pp.303-306.
Lit. 6.

Usually genetics in school are taught on the basis of the example of insects, mice or plants, which usually are of no particular interest to pupils. The author suggests the use of genetics examples pertaining to the domestic cat (*Felix silvestris doesticus SCHREBER*). Photographs can be used for illustrations, as well as slides, visits with breeders and an excursion to a cat show. The author describes mono-hybrid heredity on the basis of the British short hair cat.

didactics of biology - biology instruction - zoology -
genetics - domestic cat - teaching project - Great Britain. 147307.

502. GOODRIDGE, F.:

The teaching of protein synthesis - a microcomputer based method

Journal of Biological Education, 17, 1983, No. 3,
pp. 222-224. Lit. 2, 2 figs.

The author cites two programs for microcomputers which can be used by secondary or college students, which simulate the synthesis of proteins. Other

programs concern the development of DNA, complementary sequences, triplet codes, etc. Where microcomputers are available for students to work with, the programs will be highly rewarding.

didactics of biology - biology instruction - general biology - macromolecular biology - computer software - simulation - protein synthesis - Great Britain.
147307.

903. GRAPP, J. - MICEK, W.:

Konspekty z ekologii dla klasy VII (Outlines for ecology lessons in the 7th class)

Biologia w szkole, 36, 1983, No. 2, pp. 116-118.

The authors discuss the teaching syllabus for the 7th class where 1 weekly lesson is devoted to ecology and environmental conservation, evolution and general biology. So far this syllabus is under verification in experimental schools. They recommend various literature on these subjects and provide detailed outlines of the topics "The productivity of the ecosystem" and "Sources of food." Specific examples pertaining to agriculture and oceanography are cited.

didactics of biology - biology instruction - ecology - 8th class - basic school - nature conservation - Poland. 147307.

504. HALBACH, U.:

Die Ökologische Nische (An ecological niche)

Praxis der Naturwissenschaften - Biologie, 32, 1983,
No. 4, pp. 101 - 108, Lit. 12, 9 figs., 3 tabs.

In the author's interpretation an ecological niche is the tolerance span in a multidimensional space in which each coordinate represents one ecological factor. In nature we find species of organisms with a wide ecological niche (generalized species) and those with a narrow ecological niche (specialists). Certain organisms can serve as bio-indicators for their narrow correspondence to a specific ecological situation. In the course of evolution a number of strategies have been developed which combine the advantages of generalized species, with a wide ecological incidence and specialists, which have a narrow ecological valency. These strategies include for instance adjustment to the climate, periodical movements of the specie, cyclomorphosis and polymorphism. These different biological phenomena in fact represent only different forms of adaptation to the variability of the environment. The concept of an ecological niche is a valuable didactical medium for discovering and introducing order into the great variability of living nature. Also the principles of competition and changes of characteristics should be mentioned in this context.

didactics of biology - biology instruction - ecology -
ecological niche - definitions - PRG. 147307.

505. HOLZMANN, B.:

Anmerkungen zur Bedeutung der Geschichte der Biologie
für den Unterricht in den Sekundarstufen I und II

(Comments on the importance of the history of biology
in the biology course of general education secondary
schools)

Der mathematische und naturwissenschaftliche Unter-
richt, 36, 1983, No. 1, pp. 41-46. Lit.16.

Since the success of a book on the history of
biology and the success of a textbook on this subject
(Götts, E. and Knodel, H.: Erkenntnissgewinnung in der
biologie, 1980), the question has arisen of whether
the history of biology should be included into the
school curriculum. In 1981 in the FRG a resolution
was submitted which asks that the history of biology
be included into the upper classes of secondary school.
It points out that this should not be a separate
teaching subject, but rather a teaching principle,
which should, however, also be taken into account
in the lower classes of secondary school. The authors
cite the example of outstanding scientists with whose
life and most important scientific contribution, as
well as scientific methods, pupils should become ac-
quainted during their education.

didactics of biology - biology instruction - history
of biology - secondary schools - curriculum - FRG.
147307.

506. HUTCHINSON, C.S. - SUTCLIFFE, J.P.:

An approach to the teaching of cell water relations in biology at A-level using the water potential concept

Journal of Biological Education, 17, 1983, No. 2, pp. 123-130. Lit. 5, 4 figs.

The authors provide an outline of the topic of water in the cell and various problems connected with this. Essentially this is a problem of explaining osmosis and water potential. The authors stress the use of interdisciplinary relations in dealing with this complex phenomenon, especially relations to physics and chemistry and they provide examples for dealing with the problem cited in the title from the point of view of botany and zoology.

didactics of biology - biology instruction - physiology - general biology - cells - Great Britain. 147307.

507. YORDANOV, S.D.:

Vmozhnosti za fakultativno izuchavane na nakoy filosofski problemi na biologiyata (The opportunity for elective courses in philosophical problems of biology)

Biologiya i khimiya, 26, 1983, No. 4, pp. 32-36.

In Bulgariaschools to an increasing extent instruction is individualized and also differentiated. At present in various schools the following forms of differentiated courses are taught: special courses, hobby clubs, elective courses. Here the author cites the example of an elective course on the philosophical aspects of biology on the basis of dialectical materialism. The subject matter of this course is divided

into 20 lessons and 4 thematic units, which concern the origin and essence of life, the laws governing the development of living nature, the mutual relationship between methods used by the natural sciences and other sciences and specific methods for studying living nature. The author provides a detailed schedule for teaching these topics and specifically discusses mechanistic approaches to living nature and their critique.

didactics of biology - biology instruction - general biology - dialectical materialism - elective course - Bulgaria. 147307.

508. KLAUSNITZER, B.:

Urbane Ökologie (Urban ecology)

Biologie in der Schule, 32, 1983, No. 7-8, pp. 327-332.

1 tab., 2 figs., 6 photos.

Urban ecology studies the structure and function of ecosystems in cities. It for instance deals with problems of succession in cities, the adaptation of plants to an urban environment, bio-indicators, the concept of urban greenery, the conservation of flora and fauna found in cities, etc. The author devotes special attention to urban ecosystems which include such problems as the density of the population, the input of large amounts of matter and energy, noise, etc. and also with the division of cities from an ecological point of view into three types. The author then deals with the specific aspects of an urban microclimate and urban flora which includes 600 - 1000 species, as well as fauna, which besides mice and rats,

wild pigeons and about 300 species of insects connected with man also includes mites, roundworms and bear animalcules. In conclusion the author discusses various opportunities for the observation of urban flora and fauna.

didactics of biology - biology instruction - botany - zoology - urban environment - flora and fauna - GDR.
147307.

509. KUTTIG, G.:

Selbständige Schülerarbeit in der Stoffeinheit

"Ökologische Potenz der Organismen" - Klasse 9

(Independent activities of pupils in the 9th class within the framework of the thematic unit "Ecological potential of organisms")

Biologie in der Schule, 32, 1983, No. 2-3, pp. 80-83, 1 fig.

The aim of the article is to show how in the course of two teaching lessons on the above mentioned topic it is possible to organize independent work by pupils. The topics this is demonstrated on are "The tolerance of plants to light" and "The tolerance of plants to other factors in the environment". The author discusses the educational and instruction objectives of these topics and various stages of teaching them.

didactics of biology - biology instruction - ecology - plants + light - plant + environmental factors - GDR.
147313.

510. MATZKE, M.:

Zur Behandlung der Stoffeinheit "Theorie der Stammesentwicklung". Klasse 10 (On teaching the thematic unit "The theory of phylogeny" in the 10th class)
Biologie in der Schule, 32, 1983, No. 11, pp.427-430.
3 figs.

"Phylogenetic theory" in the teaching syllabus now in use is replaced in the new version of the teaching syllabus for the 10th class with the topic "Evolutionary theory". The author discusses the new syllabus, especially the methodological aspects of the changes which are being implemented; he also discusses educational and teaching objectives, learning problems encountered and other aspects of classwork.

didactics of biology - biology instruction - evolution - phylogeny - evolution - 10th class - changes in syllabus - GDR. 147313.

511. NOWACKA, M.:

Rola parków narodowych, rezerwatów i pomników przyrody. Konspekt lekcji dla klasy VI. (The role of national parks, reservations and natural monuments. The outline of a lesson in the 6th class)
Biologia w szkole, 36, 1983, No. 5, pp. 299-302.
1 photo, 1 crossword puzzle.

This nature conservation topic deals with the importance of national parks, natural reservations and natural monuments. The author formulates the educational and teaching objectives of this topic and discusses correct teaching strategies, as well as various teaching aids and media which might be used.

Among the latter, the author cites various films, a map of Poland and photographs from various national parks. Also opportunities for organizing excursions to some national park or reservation are discussed.

didactics of biology - biology instruction - nature conservation - environmental control - teaching media - national parks - Poland. 147307.

512. ODSTRČIL, J. - ODSTRČILOVÁ, M.:

Zkušenosti z vyučování tematickému celku "Historie života na Zemi" (Experience with teaching the thematic unit "The history of life on Earth")
Přírodní vědy ve škole, 34, 1982-1983, No. 3, pp.84-86.

The authors describe their experience with introducing the most up-to-date findings concerning the history of life on Earth into the teaching process, specifically in the biology course taught at secondary nursing schools. The authors point out errors and other negative aspects of the textbooks used in this type of school and provide teachers with instructions on how to overcome these drawbacks and what new findings should be introduced into classwork so that the course is in harmony with the most modern findings of science in this area, especially from the point of view of evolution theory and modern anthropology. This approach is also important from the point of view of education towards a scientific worldview. The authors specifically deal with plant evolution and the evolution of animals and man, for a total of 9 teaching lessons.

didactics of biology - biology instruction - general
biology - evolution - secondary nursing school -
modernization of syllabus - Czechoslovakia. 147313.

513. PESCHEK, S.:

Arbeits- und Betriebserfahrungen der Schüler zur
Züchtung von Pflanzen und Tiere (Work and occupational
experiences of pupils in connection with the topic
"The cultivation of plants and breeding of animals")
Biologie in der Schule, 32, 1983, No. 6, pp. 231-233.
1 tab.

The article provides instructions for using a
correct approach to the topic "Cultivating plants and
breeding animals" which¹⁵ taught in the 10th class. The
author analyses the approach to this topic in the
teaching syllabus, formulates educational and teaching
objectives and provides various instructions for the
correct formulation of questions and the giving of
assignments; he also discusses the relation of this
topic to other sections of the biology syllabus.

didactics of biology - biology instruction - 10th
class - work education - plant cultivation - animal
breeding - vocational guidance - GDR. 147313.

514. RUBACHEVA, L.I.:

Odin iz variantov tematicheskogo planirovaniya ucheb-
nogo materiala po obshchey biologii - X. klass
(One alternative for the thematic planning of the
general biology teaching syllabus for the 10th class)
Biologiya v shkole, 57, 1983, No. 6, pp. 49-51.

The continuation of an article published in the
4th and 5th issues of this journal (1983), which deals

with those sections of the general biology teaching syllabus concerning the basic laws of heredity (9 lessons). For each teaching unit the author recommends teaching methods and procedures, the use of teaching aids and media, and homework assignments.

didactics of biology - biology instruction - general biology - genetics - 10th class - thematic plan - teaching lesson - USSR. 147307.

515. SEHMIAU, W.:

Zielorientierung in Klasse 10 - Erfahrungen und Vorschläge (Objectives orientation in the 10th class - experience and suggestions)

Biologie in der Schule, 32, 1983, No. 10, pp. 385-387.
1 tab.

The author describes his own experience with teaching by objectives those sections of the 10th class biology syllabus which concern genetics and phylogeny. The teaching objective should first be clarified in a discussion with pupils or it can be formulated by the teacher. The article then describes in detail how to proceed and how to structure the subject-matter. The objective has the form of a question, to which answers are sought.

didactics of biology - biology instruction - general biology - genetics - phylogeny - 10th class - GDR. 147313.

516. SCHAEFER, C.:

Der Energie Begriff im Ökologischen Kontext

(The notion of energy in an ecological context)

Praxis der Naturwissenschaften im Unterricht -

Biologie, 32, 1983, No. 7, pp. 197-202. Lit. 12.

6 figs.

The author deals with the notion of energy from the point of view of various sciences and from the point of view of biology instruction. Energy can be studied from the point of view of physics, chemistry, but also biology. The article discusses in detail the didactical approach to this subject-matter. Exclusive and inclusive thinking is described in the context of understanding energy. Both terms form an association spectrum, which changes in various situations. The notion of energy in an ecological context has further specific meanings, which the author explains.

didactics of biology - biology instruction -
interdisciplinary relations - energy - ecology - PRG.
147307.

517. SCHIEFER, H.:

Zur Reaktivierung von Wissen für die Stoffeinheit

"Individualentwicklung mehrzelliger Tiere und des Menschen" (To reactivate knowledge for the thematic unit "The individual development of multicellular animals and man")

Biologie in der Schule, 32, 1983, No. 2-3, pp.90-91.

The teaching syllabus used in the biology course in general education secondary schools has been changed

and now requires the use of improved teaching methods. An important factor in successfully teaching according to the new syllabus is the reactivation of knowledge which pupils acquired earlier, in basic school. The author explains in detail how to renew previously acquired knowledge in the context of zoology and general biology.

didactics of biology - biology instruction - general biology - ontogeny - zoology - GDR. 147313.

518. SCHMIDT, H.:

Das Schilf (Phragmites communis). Material zu einer Faktorenanalyse (Reeds (Phragmites communis). Material for factor analysis).
Praxis der Naturwissenschaften - Biologie, 32, 1983, No. 7, pp. 202-214. Lit. 8, 14 figs.

Before a synecology of the ecosystem is taught, the autecological place of individual organisms in the ecosystem should be explained. The problem, however, is that material for a description of biotic and abiotic factors is usually not provided in the relevant literature and the busy teacher does not have the time to seek out and prepare such material. The author of this article therefore provides all the required information about reeds, their biology and how they grow, their relation to water areas, their metabolism, the temperature and amount of light, they require, photosynthesis and also human and biotic factors, as well as the influence of reeds upon the environment. This information will facilitate preparations for an excursion and the study of this interesting plant in classwork.

didactics of biology - biology instruction - ecology -
ecosystem - biota - FRG. 147313.

519. STEWART, J.:

Student Problem Solving in High School Genetics
Science Education, 67, 1983, No. 4, pp. 523-540,
2 figs., 7 tabs.

The author describes a research project concerning basic knowledge in genetics for high school students: 12 first year students and 15 second year students participated; all of them had chosen biology before physics, chemistry or special biology. Students were asked to solve a problem in monohybridization on the basis of a simulated experiment where people with five fingers were cross-bred with people with six fingers and a problem in dihybridization where pink coloured pigs with straight tails were cross-bred with pigs with curly tails and black spots. A detailed analysis of students' knowledge and skills indicated insufficient preliminary knowledge in genetics gained in high school.

didactics of biology - biology instruction - genetics -
general biology - appraisal of knowledge - monohybridization - dihybridization - USA. 147315.

520. TITZMAN, M.:

Erkenntnismethoden bei der Behandlung des Stoffgebietes "Die Lebewesen in ihrer Umwelt" - Klasse 9
(Cognitive methods in teaching the thematic unit
"Organisms in their environment" in the 9th class)
Biologie in der Schule, 32, 1983, No. 1, pp. 14-18,
4 figs., 3 tabs.

According to the teaching syllabus, pupils should learn not only experimental methods in biology, but also mental and other work methods. Practical experience, however, indicates that these are often overlooked. To overcome this situation the author offers various suggestions which can be implemented in ecology teaching in the 9th class. His suggestions concern for instance the tolerance of plants towards temperature variability, the influence of polluted water on a microorganism, etc. For each problem a hypothesis is formulated, various activities carried out by either the teacher or the pupils themselves and then conclusions are drawn from the activity.

didactics of biology - biology instruction - general
biology - ecology - organisms + environment - 9th class -
GDR. 146313.

521. ZABEL, E.:

Zur methodisch-technischen Durchführung des fakultativen Lehrgangs "Bau und Leistung von Zellen, Geweben und Organen". Teillehrgang 2 (On the methodological and technical aspects of teaching an elective course on "The structure and activities of cells, tissues and organs". Part 2)

Biologie in der Schule, 32, 1983, No. 9, pp. 348-353.
1 fig.

The second part of an elective course on the structure and function of microorganisms from an autecological point of view concentrates on physiological and autecological problems. Yeast cells are used for observations and experiments, as well as unicellular algae. The author describes in detail selected experiments which concern yeast metabolism, their dissimilation in aerobic conditions, carbon dioxide as a factor which influences their reproduction, the value of the pH factor, etc. For each topic the objective of teaching is cited and recommendations are provided concerning teaching methods, aids and technical requirements.

didactics of biology - biology instruction - elective course - microorganisms - autecology - observations - experiments - yeast cells - GDR. 147313.

522. ZARKOVA, L.:

Razvivie na myshleneto chrez reshavane na genetichni zadachi pri obuchenieto po obshcha biologiya v deseti klas (The development of thinking in solving genetic problems in general biology teaching in the 10th class) Biologiya i khimiya, 26, 1983, No. 4, pp. 52-56.
Lit. 8, 3 figs. 1 tab.

According to the new teaching syllabus pupils should participate in problem solving which should become increasingly difficult. This leads the pupil to greater concentration and perception and newly acquired knowledge is more permanent. The thematic unit "The foundations of genetics and selection" provides a number of opportunities for developing logical thinking. In the period 1978-1980 a study was carried out at the L. Popov general education secondary school in Plovdiv where the control group of pupils was taught in a traditional manner while an experimental group participated in a project where pupils were given independent assignments in genetics; they were asked to solve specific problems, with minimal help from their teacher. The author describes in detail a lesson devoted to monohybridization and the foundations of chromosomal theory.

didactics of biology - biology instruction - general biology - genetics - selection - teaching methods - Bulgaria. 147313.

13. The outcome of biology instruction

523. ALMEYER, D.:

Gute Erfahrungen mit verhaltensbiologischen Untersuchungen im fakultativen Biologieunterricht (Positive experience with ethological findings in elective biology courses)

Biologie in der Schule, 32, 1983, No. 1, pp. 11-13.
1 tab.

The author uses the findings of ethology in an elective biology course taught at a general education secondary school because modern ethology brings various information about the behaviour of animals who are often misunderstood by people, and these problems are interesting for pupils. In the existing biology teaching syllabus insufficient attention is devoted to ethology and hence elective courses should offer the opportunity to fill in this gap. Also ethology provides opportunities for pupils and their teachers to participate in socially beneficial work. The author describes in detail his experience with this type of instruction.

didactics of biology - biology instruction - zoology - ethology - elective course - general education secondary school - GDR. 147313.

524. GARDNER, M.E. - YAGER, R.E.:

How Does the U.S. Stack Up ?

The Science Teacher, 50, 1983, No. 7, pp. 22-26.
Lit. 22, 2 photos.

The authors point out that American schools are lagging behind in the training of high quality technicians and scientists. Especially mathematics education in secondary schools is not keeping pace, in spite of the fact that mathematics are such an important component of further study in so many fields. The first step towards improving the situation was taken in 1976 when a new curriculum was introduced. At present the US needs a new Sputnik case to arouse it to a better performance and achievement standard in the whole school system. The author describes in detail the situation in the school systems of the USSR, Japan, the GDR, Poland, Hungary and Czechoslovakia, as well as the advances made by the school system in the Chinese Peoples Republic. The authors also discuss the quality of high school and college graduates in various parts of the US.

didactics of biology - biology instruction -
secondary schools - mathematics - science - USA.
147313.

525. SIMONYAN, O.P. - BARKHODARIAN, R.A.:

Vesti iz shkol (New events in the schools)

Biologiya v shkole, 57, 1983, p. 73.

The authors describe some of their positive experiences in various schools in the Armenian SSR. At the occasion of various anniversaries vineyards and orchards, as well as gardens have been founded

by pupils under the supervision of their biology teachers. Also annually "bird days" are organized where pupils make bird boxes and also prepare bulletin boards and posters on bird conservation. "Flower days" are devoted to similar activities, with special stress on the cultivation of specific species of flowers which are then given to younger pupils to care for. These activities all contribute to nature conservation and the learning of specific skills.

didactics of biology - biology instruction - botany - ornithology - plant cultivation - decorative plants - Armenian schools - USSR. 147313.

526. Uchoniye - shkola (Scientists and schools)
Biologiya v shkole, 57, 1983, No. 4, p. 59.

The chairman of the Council of Directors of the Pushchinsk Scientific Centre for Biological Research of the Academy of Sciences of the USSR, G.R. Ivanicky in this interview assesses the work of several years carried out by scientists and teachers, as well as specialists in methodology, which has been aimed at improving the quality of teaching pupils in general education schools. He also provides information on a project concerning experiments in school which was undertaken with pupils in the 7th to 10th classes. The findings indicate that lessons taught by qualified specialists and the excursions which they organize stimulate cognitive activities among pupils and help to form a dialectical and materialistic world-view; they also support the vocational guidance of pupils towards the natural sciences. Cooperation

between scientists and schools supports the improvement of the specialized and methodological qualification of teachers as well as the pedagogical skills of scientists, who occasionally teach.

didactics of biology - biology instruction - elective courses - cooperation with science - US3R. 147361.

13.1 Verification of results achieved in biology instruction, repetitions, strengthening, systemization and structuralization of subject-matter, surveys of subject-matter.

527. BABAKOVA, T.A.:

Is opita primeneniya voprosu i zadaniy pri proverke znaniy uchashchikhsya po zoologii (Experience with asking questions and giving assignments in the verification of pupils' knowledge in zoology)
Biologie in der Schule, 57, 1983, No. 1, pp. 33-36.

In the modern approach to biology instruction pupils are required not so much to learn by rote, but especially to think independently, to analyse, compare and to make use of knowledge learnt in other teaching subjects, etc. In other words pupils should demonstrate that they are capable of independent creative thinking. The author in this article analyses the objectives, methods and outcome of modern biology instruction and cites as examples various questions, class assignments, homework, etc. She also analyses various methods of asking questions and verifying answers. All the examples

cited concern zoology and can thus be made use of by the reader in his own teaching.

didactics of biology - biology instruction - zoology - verification of knowledge - USSR. 147315.

326. CARRICK, T.:

Some Biology Teachers' Goals for Advanced Level Teaching

Journal of Biological Education, 17, 1983, No. 3, pp. 205-214.

Lit. 17, 10 tabs.

The author provides information on the course of a discussion among a group of American teachers concerning the goals of teachers in A-level teaching in secondary schools. The teachers expressed their opinion on the purpose of biology teaching, its content, teaching media, teaching methods and organizational forms of teaching. The discussion took place in West Midlands.

didactics of biology - biology instruction - secondary school - teaching objectives - teacher discussion - Great Britain - 147315.

529. DOBBERPHUL, C. - TRÖSTER, E.:

Zum aktuellen Thema. Höhere Lernergebnisse durch Nutzung fachspezifischer und fachübergreifender Vorleistungen

(On a current topic. Better results are achieved in teaching by making use of previously learnt special knowledge and knowledge based on interdisciplinary relations).

Biologie in der Schule, 32, 1983, No. 12, pp. 475-478.

Achieving an understanding of the laws and essence of metabolism processes requires making use of interdisciplinary relations with physics and chemistry. The authors cite which facts from the physics and chemistry teaching syllabi should specifically be made use of. They also discuss making use of knowledge learnt in biology in previous classes, in the context of metabolism, for instance the subject-matter which deals with energy conservation.

didactics of biology - biology instruction - interdisciplinary relations - outcome of teaching - metabolism - GDR. 147313.

530. ETSCHENBERG, K.:

Welche biologischen Objekte können Schüler beim Übergang in die Sekundarstufe I benennen? (Which natural objects can pupils name when entering the lower classes of secondary school ?)

Naturwissenschaften im Unterricht - Biologie, 31, 1983, No. 10, pp. 344-351. Lit. 2, 6 figs., 3 worksheets.

The author provides information about a project to determine knowledge of biological objects, including flora and fauna, which pupils bring with them to se-

condary school from the last class of basic school. He found that they had much better knowledge of animals than plants, that those who wanted to study at a general education secondary school had the best knowledge and that knowledge in biology was mostly in agreement with school marks in general. 311 pupils were included in the study, which was carried out in the district of Cologne over the Rhine at the end of the school year 1981-1982.

didactics of biology - biology instruction - basic school - secondary school - knowledge of flora and fauna - FRG. 147315.

531. TSAHEY, Z.:

Rezultati ot vnedryavaneto na novoto uchebno sdrshanie po biologiya v deviti klas (The preliminary outcome of teaching according to the new biology teaching syllabus in the 9th class)

Biologiya i khimiya, 26, 1983, No. 2, pp. 20-26.
1 tab.

The new teaching syllabus for biology in the 9th class has been changed on the basis of modern biological science. The purpose of the changes is to improve the scientific and theoretical quality of the course. Besides the classical evolution theory of C. Darwin, the most up to date findings of evolutionary theory genetics, etc. have been added. Special attention is devoted to the relation between ontogeny and phylogeny in the organism, as well as to genetics and ecology. The subject-matter of instruction is now more comprehensive and integrates knowledge from various

fields of biology. In 1982-1983 an intensive study of the quality of the textbooks in use was undertaken, as well as on the available methodological handbooks and various teaching aids, and a number of questionnaire project with teachers were organised on these problems. The majority of the respondents from among teachers demonstrated an understanding of the new syllabus, but many admitted they had thus far not made full use of pupils' knowledge acquired previously and in other teaching subjects.

didactics of biology - biology instruction - outcome of instruction - new syllabus - 9th class - Bulgaria. 147315.

532. CHRUSZCZEWSKA, B.:

Podsumowanie dyskusji nad projektem programu biologii w liceum ogólnokształcącym (A summary of the discussion on the draft biology teaching syllabus for general education secondary schools.)

Biologia w szkole, 36, 1983, No. 5, pp. 273-276.
1 tab.

The new draft of a biology teaching syllabus for general education secondary schools in Poland has been subject to a discussion among teachers. The syllabus is for the 1st to 4th class and assumes 2 lessons per week; in the biology-chemistry specialization three hours per week. In the author's opinion the draft requires a number of revisions. The list of assignments and exercises should be expanded, some redundant sections should be deleted, a larger number of lessons should be devoted to repetitions and strengthening and more lessons should be

devoted to exercises and excursions. Interdisciplinary relations with physics and chemistry should be improved and made more explicit, greater attention should be devoted to the forming of notions and terms and phylogeny should be stressed when providing a survey of plants and animals. Sections concerning nature conservation and environmental control should be extended. Sections on ethology should be reduced in view of the fact that the majority of teachers do not have the required qualification. A minidictionary of biological terms should be provided for pupils and the post-graduate study of teachers should be extended.

didactics of biology - biology instruction - teaching syllabus - general education secondary school - syllabus revision - Poland. 147307.

533. PADALKO, N.V.:

K ocenke znaniy i umeniy uchastchikhaya po biologii:
(On assessing the biology knowledge and skills of pupils)

Biologiya v shkole, 37, 1983, No. 6, pp. 13-14.

An assessment of the outcome of instruction should have an educational, assessment and instruction function. Assessment should, however, always be considered together with other factors and not in an isolated manner. The problems connected with assessments include the problem of how questions should be asked, what should be assessed and by what scale. The foundation for these questions should be provided by the educational and teaching objectives formulated by the teaching syllabus. The author also discusses the

problem of knowledge parameters which should have priority when an assessment is made. These should include the correctness and committed nature of the response, an awareness of relations, how complete the response is and how logical. The author also provides an analysis of possible answers by pupils and their assessment on the basis of the example of the topic "The significance of water for plant life".

didactics of biology - biology instruction - outcome of instruction - assessment - USSR. 147315.

534. PADALKO, N.V.:

Obobshcheniye i povtorenie znaniy uchashchikhsya o rastenii kak tselostnom organizme. V. klass
(The generalization and repetition of pupils' knowledge concerning the plant as an integrated organism. 5th class)

Biologiya v shkole, 57, 1983, No. 3, pp. 16-22.

In the final topic taught in the biology course in the 5th class pupils should learn to generalize the laws of nature as far as living matter is concerned and their manifestations in plants, and they should achieve an understanding of the relation between individual organs and the organism as a whole, as well as the relation existing between the organism and the environment. Pupils should also acquire an understanding of the material essence of processes taking place in nature and the possibility we have of utilizing this knowledge for the creation of optimum conditions for the cultivation of crops. On this basis the author provides the outline of a 5 lesson thematic unit on the topic cited in the title, were the follow-

ing subject-matter is dealt with: the cellular structure of plants, the plant as an integrated organism, conditions for the life of a plant, the development of the plant in the course of the year and the alteration of the seasons. The author recommends the forest as the best locality for an excursion, or a park or school garden, if the forest is too distant.

didactics of biology - biology instruction - repetitions - generalization - botany - organisms - 5th class - USSR. 147315.

535. PANAYOTOV, A. - KISKINOVA, N. - VOLODARSKAYA, I.: Edin vzmozhen analiz s preporki za obucheniето po temita "Chervej" i "Nasekomi" - biologiya VI klas (An alternative analysis of the teaching subject-matter on the topics "Worms" and "Insects" in the 6th class biology course) *Biologiya i khimiya*, 26, 1983, No. 1, pp. 32-37. Lit. 13.

The authors provide biology teachers with alternatives for carrying out the analysis and assessment of the specific topics mentioned in the title. First they provide a comprehensive analysis of the objectives of teaching these topics in relation to the structure of the teaching syllabus. Then they analyse the teaching process from a methodological point of view, as far as the theoretical foundations of cognition are concerned. The use of this alternative, however, assumes that teachers are well acquainted with the biology syllabus as a whole and other documents which provide directives and standards for instruction.

didactics of biology - biology instruction - analysis
of syllabus - assessment of teaching process - Bulgaria.
147315.

536. PODSTOLSKA, M.:

Nauczyciele o nowym programie dla klasy VII.

(Teachers express their view of the new teaching
syllabus for the 7th class)

Biologia w szkole, 36, 1983, No. 5. pp. 277-281.

The new teaching syllabus for the 7th class was first verified in 19 schools. Among the points of verification were the demands placed on pupils, the subject-matter and its division in the textbook, the teaching media required and whether they are available. These analyses were carried out by the teachers who had used the new syllabus. Among special points they studied were also relations with the subject-matter taught in other classes, specifically zoology and human biology in the 6th class and how pupils understand some specific notions such as respiration, as well as basic relations towards chemistry, where it was studied how pupils understand such terms as glycogen, aminoacid and lactic acid when they have not yet had the opportunity to study chemistry. Another studied problem was whether what pupils learnt in the 4th class of basic school has created a sufficient background for learning about human reproduction in the 7th class. The described analysis of the new teaching syllabus has proven to be very fertile and indicated the direction of solving a number of problems in biology instruction.

didactics of biology - biology instruction - human biology - outcome of instruction - verification of syllabus - Poland. 147315.

537. RADTKE, W.:

Reaktivierung des Grundwissens - Voraussetzung für gute Unterrichtsergebnisse in der Abiturstufe

(The reactivation of basic subject-matter - a prerequisite for good results in the final class of general education secondary school)

Biologie in der Schule, 32, 1983, No. 2-3, pp. 89-90.

The new biology teaching syllabus for general education secondary schools places extensive demands upon the "reactivation stage" of teaching in the final class. Learning new material is possible only on the basis of a thorough knowledge of basic subject-matter. The author describes his own experience with teaching the topic Bacteria, where individual stages of instruction are analysed and supplementary literature is cited, as well as the amount of required time.

didactics of biology - biology instruction - teaching syllabus - general education secondary school - repetition - bacteria - GDR. 147307.

538. RISCHER, H.:

Gedanken zur Wiederholung und Systematisierung in Klasse 8 (Comments on repetition and systemization in the 8th class)

Biologie in der Schule, 32, 1983, No. 11, pp.425-426.

The repetition and systemization of the subject-matter taught throughout the 8th class re-

quires more than the 2 teaching lessons which the syllabus assumes should be devoted to these activities. The author cites the opinion of Davydov concerning the methodological aspects of advancing from the abstract to the specific, and stresses the need for proper systemization of what has been learnt, including the concrete reproduction of what was at first an abstract principle. This concretization is carried out on the basis of the example of the topic "Blood and the lymphatic system" and "Repetition and systemization of metabolism".

didactics of biology - biology instruction - 8th class - basic school - repetition - systemization - human biology - GDR. 147315.

539. THIEL, D. - SIBBING, W.:

Empirische Untersuchungen in einem Jugendwaldheim
(Empirical studies carried out in a forest home for young people)
Naturwissenschaften im Unterricht, 11, 1983, No. 5,
pp. 150-153. 8 tabs.

The authors describe the use made of a youth home found in the forest where under the supervision of forest-keepers they learn about nature and become acquainted with the forest and its living community. Stress is placed on nature conservation aspects. The forest home at Urft in Eifel was visited by 1813 pupils from various types of school in the period 1976-1978. The pupils all came from cities and did not regularly have the opportunity to become acquainted with nature. Before leaving all the children were given questionnaires which aimed at

establishing how much they had learnt while in the home. 86.2 % assessed the excursion in a very positive manner, 11.2 % as interesting and only 2.6 % expressed negative attitudes.

didactics of biology - biology instruction - field work - excursion - forest community - assessment - FRG. 147315.

13.2 Assessment of results achieved in biology instruction

540. DAVIDOVSKAYA, O.A.:

O samostoyatelnikh rabotakh uchashchikhaya na urokakh obshchey biologii v IX klasse (On the independent work of pupils in biology classwork in the 9th class)

Biologiya v shkole, 57, 1983, No. 1, pp. 29-33.
4 tabs.

The author in this article describes her own practical experience with teaching general biology in the 9th class. First she points out that general biology is usually taught without any demonstrations and practical exercises, but only as a theoretical science. For this reason she stresses independent laboratory work done by pupils in the course of class work in general biology. Some of these projects can also be used in previous classes. All the examples cited represent an important contribution to general biology instruction.

didactics of biology - biology instruction -
general biology - 9th class - laboratory work -
USSR. 147313.

541. IWON, W.:

Lernerfolgsicherung im Biologieunterricht

(Assuring successful learning by pupils in biology
classes)

Naturwissenschaften im Unterricht, 31, 1983, No. 8,
pp. 262-265. Lit. 8, 2 worksheets, 1 tab.

The author, together with 110 pupils from a
general education secondary school, carried out a
study project concerning the effectiveness of
teaching. He specifically studied independent pupils'
work with various texts and found that best results
were achieved when pupils worked independently with
a text, which they were asked to extend and fill in.
The test text had 16 points left out and pupils
were asked to fill in the correct answer. Another
test was administered 6 weeks after the first, to
determine recall.

didactics of biology - biology instruction - tests -
assessment - independent work - FRG. 147313.

542. KUKAN, Š. - ŽILKOVÁ, H.:

Skúsenosti a výučbu biológie v experimentálnych triedach I. ročníka gymnázia (Experience with biology teaching in 1st class experimental classes of general education secondary schools)
Prírodné vedy vo škole, 34, 1982-1983, No. 9, pp. 328-330.

The authors studied biology instruction in the 1st class of an experimental general education secondary school. They analysed the new draft teaching syllabus for this instruction and the textbook used and concentrated on three thematic units (introduction, the general characteristics of living systems and a survey of the natural system of living nature). The authors assess how various parts of the syllabus are linked to the textbook, they compare the old version of the teaching syllabus with the draft of the new version and sum up their experience in this area. The new syllabus and textbook are assessed in a positive manner.

didactics of biology - biology instruction - general education secondary school - 1st class - experimental instruction - biology teaching syllabus - biology textbook - assessment - Czechoslovakia. 147315.

543. LENOCHOVÁ, M. - HOMOLA, J.:

Výsledky ověřování nového modelu biologie v 1. ročníku gymnázia (Assessment of the new model of biology instruction used in the 1st class of general education secondary schools)

Přírodní vědy ve škole, 14, 1982-1983, No. 1, pp. 6-7.

The authors provide brief information on the outcome of assessment of the experimental verification of the new model of biology instruction in the 1st class of general education secondary schools, which was carried out on the basis of tests to determine pupils learning. The aim of this two-year study (carried out in 1979-1980 and 1980-1981) was to verify all aspects of instruction, including the teaching syllabus, textbook, didactical media and teaching aids and the outcome of instruction as determined by tests, as well as the limits posed by material and personnel. The most serious problems were found in the teaching of cytology and carrying out experiments in cytology (microscope exercises) where too many new terms were used and the subject-matter taught was too extensive. A reduction of this subject-matter is recommended.

didactics of biology - biology instruction - general education secondary school - experiments - 1st class - assessment - Czechoslovakia. 147315.

544. TATE, R. - BURKMAN, E.:

Introductive Effects of Source of Direction,
Allocated Time, Reading Ability and Study
Orientation on Achievement in High School Science
Science Education, 67, 1983, No. 4, pp. 509-522.
3 figs., 2 tabs.

This theoretical paper shows the various factors which influence the quality of high school science instruction, on the basis of tests administered to teachers and students. An analysis of the tests indicated that if disproportions between students' abilities and their actual achievement are not to occur, the teacher must have a purposeful approach to teaching and control classwork in an adequate manner. The time allocated to lectures, laboratory work and excursions is also very important, as is homework. 62 teachers took the test and 1 108 students from 75 classes in several states. 55 % of the testees were girls.

didactics of biology - biology instruction - school achievement - study of teachers and students - USA.
147315.

545. VOSS, B.E.:

A Summary of Research in Science Education - 1981
Science Education, 67, 1983, No. 3, pp. 287-419.

A survey of the study of science teaching in the year 1981 which contains an analyses of 400 thesis summaries, articles, research reports and papers submitted to conferences. Articles come also from British and other foreign journals. The classification of this material includes for in-

stance the teaching of natural sciences, cognitive methods, Piaget studies, characteristics of students and classwork, materials used by teachers, teaching technologies, assessment of achievements, teacher training, etc. Added to the survey is a bibliography and a list of the names and addresses of research institutions in countries of the southern hemisphere.

didactics of biology - biology instruction - assessments - research - USA. 147323.

13.3 School-leaving examinations in biology

546. GOLLE, B.:

Zur Auswertung und Vorbereitung der schriftlichen Abschlussprüfung im Fach Biologie (An assessment of preparations for the written part of final examinations in biology)

Biologie in der Schule, 32, 1983, No. 1, pp. 18-21.

6248 final written examinations by pupils in biology were used as source material for this analysis, as well as the opinions of district methodology specialists and teachers. The outcome is comparable to that of last year, the essays were in accord with the content of the teaching syllabus. Nevertheless, there was a high degree of variation in the marks achieved; in contrast to previous years students more often chose ecological subjects. The author cites examples of difficult and easy topics and analyses why such differences exist. In conclusion the author provides various comments on the

preparation of the written part of final examinations for the next school year.

didactics of biology - biology instruction - written examinations - school-leaving examination - GIR.
147315.

13.4 Outcome of biological competitions and work of the Young Pioneer organization in biology

547. Rola prac eksperymentalnych w nauczaniu biologii. Wyniki konkursu (The role of experimental work in biology teaching. The outcome of a competition)
Biologia w szkole, 36, 1983, No. 2, p.103.

In a 1982 competition experimental work done by pupils was awarded with various sums of money. The first prize of 3000 zloty was awarded to T. Walická for "Waliga", the 2nd prize of 2000 zloty to J. Wysockiński for "Belter" and B. Juśkiewicz for "Bio-Ex"; the 3rd prize of 1000 zloty was awarded to W. Janowski for his work "Suwalki", M. Szuryova for the work "Szarotka" and to H. Szuryova for ^{her} work "Pine trees".

didactics of biology - experimental work - competition - Poland. 147315.

548. WALICKA, T.:

Jak prowadzić prace naturalne (How to carry out work in the natural sciences)

Biologia w szkole, 36, 1983, No. 2, pp. 103-108.

Lit. 6.

Science and its new discoveries advance very rapidly and often make school biology obsolete. At the same time the demands made upon students accepted for higher education continue to increase. Also in secondary schools pupils are required to be more independent and active. The author provides information on written school-leaving examinations in biology and how pupils are prepared for participation in Biology Olympiads. The school-leaving examination is always closely linked to the teaching syllabus and the subject-matter taught in school. The author also discusses her own experience in these areas, the results she has achieved and the need to adequately remunerate teachers for this type of work.

didactics of biology - biology instruction - assessments - school-leaving examinations - biology Olympiads - Poland. 147315.

549. WYSOKIŃSKI, J.:

Prace eksperymentalne w nauczaniu biologii

(Experimental work in biology instruction)

Biologia w szkole, 36, 1983, No. 2, pp. 109-111.

1 fig.

The author describes experimental work done by pupils in botany and describes its significance for increasing the interest pupils have in biology,

its importance for intellect training, developing pupils' imagination and for better final achievements. The author describes experiments done in the 6th class of basic school concerning photosynthesis and stresses the importance of this work for the future participation of pupils in biology Olympiads.

didactics of biology - biology instruction -
experimental work - Biology Olympiads - Poland.
147315.

550. ZDEBSKA - SIROSEKAWSKA, J.:

XIV olimpiada biologiczna dla uczniew szkół średnich
w roku szkolnym 1984-1985 pod hasłem: "Biologia
współczesna i perspektywy jej rozwoju." (The XIVth
Biology Olympiad in the school year 1984-1985 with
the motto "General Biology and the Perspectives of
its Development")

Biologia w szkole, 36, 1983, No. 3, pp. 310-314.

The organizers of the Biology Olympiad for the school year 1984-1985 are the Ministry of Education, the Committee for Biological Olympiads and the Polish M. Copernicus Natural Science Association, as well as the National Committee of the Polish Nature Conservation League. These institutions have now announced individual stages of the competition. Its topic will be the characteristics of organisms on the basis of an analysis of data acquired by observations of original natural objects. Also other topics can be used which are based on the pupil's specific interest and the practical opportunities available. All topics must be within the framework of general biology.

didactics of biology - biology instruction -
Biology Olympiad - Poland. 147315.

551. ZDEBSKA - SIEROSŁAWSKA, J.:

Sukcesy olimpijczyków a wyniki egzaminów wstępnych na wyższe uczelnie (The success of Biology Olympiad participants and the outcome of entrance examinations to higher education)

Biologia w szkole, 16, 1983, No. 5, pp. 309-310.

The author comments the outcome of the Biology Olympiad held in the Łódź region last year. She provides a survey of the results in the form of a table and information about how pupils who were successful in the Olympiad did in entrance examinations to higher education institutions. All achieved very good results.

didactics of biology - biology instruction -
Biology Olympiad - university entrance examinations -
assessment - Poland. 147315.

552. ZICHÁČEK, V.:

Finále biologické Olympiády (The finals of the Biology Olympiad)

Přírodní vědy ve škole, 14, 1982-1983, No. 2, p. 50.

The 16th Biology Olympiad, which is the highest ranking biology competition in the country for secondary school youth, was held at the Department of Botany of the Palacký University at Olomouc. Victors from regional rounds participated in the final from the whole country - a total of 36 pupils. The competition took place in two groups of 18 each, where each participant was anonymous. In zoology each group

received an ecology assignment to analyze the model situation found in a pond, while in botany the problem of the structure and function of plant organs was analysed and plants and animals were identified and classified. Participants then defended a written essay and participated in discussions in four groups. During the competition participants went on an excursion to the local zoo, to a biological laboratory and to the greenhouses and laboratories of the Institute for Experimental Botany of the Czechoslovak Academy of Sciences at Olomouc, as well as to various cultural events. At the festive closing of the competition the winners were announced. The 1st prize was recieved by B. Škoda from the General Education Secondary School at Arabská Street in Prague.

didactics of biology - biology instruction - Biology Olympiads - Czechoslovakia. 147317.

13.5 Examinations in biology

553. GULENKOVA, M.A. - NIKISHOV, A.I.:

O nekotorykh tipichnykh oshibkakh v znaniyakh abiturientov. vyyavlennykh na vступitellykh ekzamenakh po biologii (Concerning some typical errors in the knowledge of secondary school graduates as they appeared in entrance examinations in biology) *Biologiya v shkole*, 57, 1983, No. 3, pp. 30-53. Lit. 6.

The authors have analysed the outcome of entrance examinations in biology at 5 faculties of the

Moscow V.I. Lenin State Pedagogical Institute. It was found that the biological education pupils had was satisfactory, the best results were achieved by those seeking acceptance to the Biology and Chemistry Faculty. In an analysis of faulty answers, the authors compared responses to the knowledge assumed in various biological disciplines according to the teaching syllabus. The largest number of errors occurred in botany, where candidates had vague knowledge of morphology, the relation between structure and function, etc., which are connected with some of the value definitions found in the relevant textbooks. In zoology, candidates were found to have good knowledge concerning the external structure of animals, but not for the making of comparisons, an understanding of evolutionary principles, etc. The reason for this is the small use of ostensive teaching media and insufficient comparisons between various species of animals in class work. In human anatomy, physiology and hygiene candidates had limited knowledge of the function of individual body organs. The largest number of errors were in the area of ^{the} reflex process in the nervous system. In general biology the greatest number of errors concerned evaluation and genetics. Also the ability of candidates to formulate a problem and their response or to make simple drawings were below expectations.

didactics of biology - biology instruction -
biological knowledge - entrance examinations - higher
education - pedagogical institute - USSR. 147315.

554. SCHIEFER, H.:

Erfahrungen mit Bewertungskriterien für mündliche Prüfungsaleistungen (Experience with assessment criteria for oral examinations)

Biologie in der Schule, 12, 1983, No. 1, pp. 26-27.

Verifying pupils' knowledge in biology requires that teachers assess in an objective manner how their pupils have learnt what was taught to them. This objectivity is more difficult to achieve in oral examinations and for this reason the author attempts to develop specific criteria for this purpose. As an example, the author describes the questions and answers in the oral part of the school-leaving examination which concern photosynthesis. Individual criteria are explained in detail.

didactics of biology - biology instruction - oral examinations - criteria - school-leaving examination - GDR. 147315.

14. The biology teacher, outstanding biology teachers

555. DOUGLAS, C. - KAHLE, J.B.:

A profile of NART: Results of the 1982 National Survey

The American Biology Teacher, 45, 1983, No. 8, pp.410-414. 2 figs., 1 tab.

A special committee of the National Association of Biology Teachers was set up for 3 study projects, one of which concerned the status of women as science

teachers in the USA and the conditions which teachers of both sexes have for becoming members of the NABT. The study analysed a number of various aspects, for instance opportunities for post-graduate study, salaries, professional activities, quality of education, number of weekly teaching hours, number of pupils in class, etc. 20 % of the respondents teach a larger number of lessons than set out in standards. Wages are 15 to 20 thousand dollars annually. This occupation makes extensive demands in terms of time. Insufficiently equipped laboratories preclude the possibility of doing independent research or scientific work.

didactics of biology - biology instruction - biology teachers - women - USA. 147305.

14.1 Demands made of biology teachers

556. PIOTROWICZ, M.:

Sylwetka nauczyciela biologii w wypowiedziach uczniów

(The profile of a biology teacher in the testimony of pupils)

Biologia w szkole, 36, 1983, No. 5, pp. 204-298.

Lit. 6, 4 tabs.

The author provides information about the findings of a project which aimed at establishing the characteristics of a biology teacher and the demands placed on him. The project described was carried out in 51 basic schools with a total of 1113 pupils and in 24 secondary schools with 625 pupils. Among the characteristics which the pupils

cited; a friendly attitude towards them, self-control, a highly demanding attitude towards pupils, a pleasant disposition, being able to easily communicate with other people, initiative, a thorough knowledge of modern biology, a knowledge of biological problems concerning the environment, having psychological skills and a number of other qualities.

didactics of biology - biology instruction - biology teacher characteristics - research project - Poland. 147305.

557. TARASOV, R.P. - GUPALO, O.I. - KUDIMOVA, V.N. - SHAPOSHNIKOV, N.I.:
O pravilnoy rechi uchitelya (On the correct speech of teachers)
Biologiya v shkole, 57, 1983, No. 4, pp. 24-26.
Lit. 4.

This article contains several separate sections, written by different authors, which have the same subject-matter: comments on the quality of verbal expression used by teachers in the course of instruction. The first author discusses the importance of speech in pupils' learning and warns against circular reasoning and also against giving pupils incorrect information due to faulty expression by the teacher. Also the negative aspects of the speech of lecturers at universities, of public speakers and of announcers on TV are discussed. Other authors discuss the need to place correct accents in words of foreign origin, the difficulties posed by homonyms and the need to carefully distinguish them, etc.

didactics of biology - biology instruction - biology teacher - speech - terminology - USSR. 147305.

14.2 Teacher training in normal, inservice and post-graduate study courses at pedagogical and natural science faculties

558. MÜLLER, J.:

Struktura kształcenia dyplomowanych nauczycieli w NDR
(The curriculum structure in educating teachers with degrees in the GDR)

Biologia w szkole, 36, 1983, No. 2, pp. 79-82.
3 tabs.

In the GDR, universities and other higher education institutions which educate teachers have a total of 11 departments of the didactics of biology. The curriculum for studying the didactics of biology is centrally determined and the topics of diploma theses are usually connected with the research tasks studied at the given school. The course of study takes two years and the student upon graduation has an aprobation in two school subjects. In the GDR, biology can be studied in combination with chemistry, physical education, geography. One subject is considered to be major and has a curriculum of 1000 hours of instruction, while the other subject is allocated only 600 hours in the curriculum. The author also describes in detail the teaching syllabi according to which the didactics of biology are taught to future teachers.

didactics of biology - teacher training - curriculum -
GDR. 147305.

559. PIVNIČKA, K.:

Studium ochrany životního prostředí na přírodově-
decké fakultě UK v Praze. (The study of environmental
conservation at the Faculty of Natural Sciences of
the Charles University in Prague)

Přírodní vědy ve škole, 14, 1982-1983, No. 9, p. 331.

The article discusses the problems connected with the development of industry and agriculture which have on the one hand lead to an increase and improvement in living standards, but at the same time also to a serious pollution of the environment. The government has now decided to introduce at the universities in Prague, Olomouc and Bratislava specializations in environmental conservation and control. The author of the article explains the need for such specialists and describes in detail the curriculum of this specialization, which assumes a thorough knowledge of chemistry, bio-chemistry, biology, economic and social geography, cartography, as well as mathematics (the use of computers), physics, genetics, microbiology, ecology, pedology, demography, hydrobiology and landscape ecology. It is assumed that graduates will work in local government administrations, in government bodies of various kinds and in research institutes which deal with nature conservation and environmental control.

didactics of biology - biology instruction - higher
education - teacher training - environmental con-
servation - curriculum - Czechoslovakia. 147305.

560. ROMANOVSKÝ, A.:

Studium biologie na přírodovědecké fakultě KU v Praze
(The study of biology at the Natural Science Faculty
of the Charles University in Prague)
Přírodní vědy ve škole, 24, 1982-1983, No. 8,
pp. 282-283.

The article provides detailed information on the study of biology at the Charles University in Prague. Students are divided into those in teacher training and those who will work in science. Non-teachers can choose one of three specializations: systematic biology, general biology and molecular biology with genetics. Specialization begins only in the 3rd year of study. The teacher training section educates teachers for the 6th to 12th class, in combination with chemistry, mathematics or physical training. The author describes the curriculum of both types of study and provides other interesting information.

didactics of biology- biology instruction - teacher training - faculty of natural sciences - curriculum - Czechoslovakia. 147305.

561. Spezialkurse für die Weiterbildung im Fach Biologie
(Special courses for further education in biology)
Biologie in der Schule, 32, 1983, No. 9, pp. 331-363.

The author provides brief information about various courses, the institutions which organize them and their curriculum. There are courses available in ethology, ecology, nature conservation, the work of biology hobby clubs, experiments in genetics,

taxonomy, applied microbiology, enzymology, biochemistry and selected problems of the didactics of biology.

didactics of biology - biology instruction - further education of teachers - GDR. 147305.

562. TOLP YGO, M.F.:

Povyshat uroven ideynno-politicheskov podgotovki uchitel'ev (For improving the ideological and political training of teachers)
Biologiya v shkole, 57, 1983, No. 5, pp. 3-6.

Ideological and political work among the masses plays a significant role in the building of socialism and schools are an important component of the ideological front. For this reason it is important to constantly improve the quality of educational work in schools. Biology teaching offers a number of opportunities for this (in the form of education towards a scientific worldview and education towards atheism), which the teacher should make full use of.

didactics of biology - biology instruction - teacher training - political and ideological education of teachers - USSR. 147305.

563. TREJLAK, S.:

Dozkonalenie zawodowe nauczycieli biologii w NDR

(The professional education of biology teachers in the GDR)

Biologia w szkole, 36, 1983, No. 2, pp. 82-87.

2 figs.

The author provides detailed information about teacher training in the GDR. Graduates of the 10th class of general education secondary schools study for 4 years and attain a degree which allows them to teach in the 1st to 4th class of basic school. Those who graduate from the 12th class and take a school leaving examination, continue in a 4 or 5 year course at a pedagogical faculty or at a university and receive a degree which allows them to teach in the higher classes of general education secondary schools and also in various vocational schools. Students study two specializations; biology is studied in combination with chemistry, geography or physical education.

didactics of biology - teacher training - curriculum - GDR. 147305.

14.3 Public activities undertaken by teachers, work in district pedagogical societies, in regional pedagogical societies, biology supervisors, visits to classes by supervisors.

564. POZOMSKA, D.:

Organizacja pracy nauczyciela metodyka biologii

(The organization of the work done by specialists in the didactics of biology)

Biologia w szkole, 36, 1983, No. 1, pp. 61-62.

The author is the district specialist for the didactics of biology in the district of Koszalinaki. She discusses her work, the records she keeps of individual teachers, the various conferences and seminars which she organizes for biology teachers, the work of subject-matter committees, etc. She also describes how she plans her work and the various activities she organizes.

didactics of biology - biology teachers - district specialist in biology didactics - Poland. 147305.

14.5 The self-education of biology teachers

565. FAUSTUS, L.:

Příprava pedagogických pracovníků na novou koncepci
předmětu biologie na středních školách

(Preparing educational personnel for the new concept
of biology instruction in secondary schools)

Přírodní vědy ve škole, 14, 1982-1983, No. 6,
pp. 205-206.

The preparation of educational personnel in secondary schools for teaching according to the new concept of biological education is very important. All teachers who teach biology in secondary schools (in combination with chemistry, etc.), as well as those who teach forestry and agriculture, biology supervisors and also the teachers of some subjects in nursing schools are undergoing special preparations. The author describes the plans for these preparations and what type of activities will take place.

didactics of biology - biology instruction - self-
-education of teachers - modernization of instruction -
secondary school - Czechoslovakia. 147305.

14.6 Pedagogical readings

967. UENLHAAR, K.H.:

Pädagogische Lesungen 1983. Erfahrungen zur Förderung von Aktivität und Selbstständigkeit der Schüler im Biologieunterricht. (Pedagogical readings 1983).

Experience with supporting pupils' activities and independence during biology instruction)

Biologie in der Schule, 12, 1983, No. 12, pp. 471-474

The Pedagogical Readings described by the author took place on February 7th to 10th 1983 in Leipzig. In the field of biology, attention was concentrated upon problems of developing pupils' activities and independence. The author provides summaries of six of the most interesting papers which concerned for instance inter-disciplinary relations between biology on the one hand and physics on the other, the equipment of biology classrooms and other problems.

didactics of biology - pedagogical readings - pupil activity - pupil independence - GER. 147303.

14.7 Meetings, conferences, congresses concerning biology

568. CICHY, D.:

Konferencja "Człowiek i środowisko" - Kanada 1982
(Report on the conference "Man and the Environment",
held in Canada in 1982)
Biologia w szkole, 16, 1983, No. 1, pp. 58-59.

On October 17th to 23rd a conference called
"Man and the Environment" was held in Hamilton,
Canada. 3000 specialist participated with 71 papers
presented by foreign lecturers and 23 papers by
Canadians. The conference was organized by four
natural science associations in the province of
Ontario. The conference stressed the importance of
education towards nature conservation for the future
of the world. The article describes the most im-
portant papers presented, as well as the discussion.

didactics of biology - education - nature conserva-
tion - conference - Canada - Poland. 147305.

569. HÖPNER, H.J.:

Meeresbiologischer Kurs (A course in marine biology)
Biologie in der Schule, 12, 1983, No. 12, p. 498.

The second course on marine biology was held
from July 11th to 16th 1983 at the marine station
Bolesławsför and concerned selected problems of the
geology and hydrography of the Baltic sea, as well
as research on selected plant and animal communities.
an excursion on a fishing boat was part of the course,

where participants later identified the organisms caught during fishing and described their ontogeny and phylogeny.

didactics of biology - biology instruction - marine biology - excursion - identification of specimens - GDR. 147305.

570. SLASTENINA, J.S.:

K problema ekologicheskogo obrazovaniya (On problems of an ecological education)

Biologiya v shkole, 57, 1963, No. 2, pp. 75-77.

The author describes an international symposium called "Ecological Education and the Moral Education of the School Collective" which was held in the autumn of 1962 in the town of Pushchino in the Moscow region and organized by the Ministry of Education of the USSR and the Academy of Pedagogical Science of the USSR. Specialists in ecological education from the countries which are members of the Council for Mutual Economic Assistance, as well as Finland participated. Participants were scientists, teachers, school principals, representatives of various organizations and others. A broad range of problems were dealt with in various papers and in the discussions which followed them, which concerned both the theory and practice of ecological teaching and education. Special attention was devoted to specific experience gained in schools, in the teaching of individual subjects and in the education of a responsible attitude towards nature on the part of young people.

didactics of biology - ecology - conference - USSR. 147303.

571. VOESACK, L.:

Zentrale Direktorenkonferenz und inhaltliche Anforderungen an die biologiemethodische Forschung und Ausbildung (A central conference of school principals concerning the requirements of schools towards research and education in the didactics of biology)
Biologie in der Schule, 12, 1981, No. 5, pp. 209-210.

A two-day scientific conference of specialists in the didactics of biology was held under the chairmanship of the secretary general of the Academy of Pedagogical Sciences, prof. Dietrich at the Karl Marx University in Leipzig. The conference, in which besides specialists in the didactics of biology, also teachers, scientists and members of the Ministry of Education staff, as well as editors from journals and publishing houses participated, discussed problems of the didactics of biology, pedagogical research projects and the theory and practice of biology instruction. The author provides a brief summary of the conference.

Didactics of biology - research - education - conference - GDR. 147323.

572. Forschungen zur Schulhygiene - seminar zur Verbesserung organisatorischer, didaktischer und methodischer Voraussetzungen (An all-union seminar on problems of organizing the hygiene and sex education of pupils)
Biologie w Schule, 11, 1981, No. 6, p. 88.

The editors of the journal provide information on an all-union seminar held in 1981 in Vilnius concerning the tasks of national education and schools in organizing health care, hygiene and the sex education of pupils; it was organized by the Ministry

of Education of the USSR and the Lithuanian SSR together with the Academy of Pedagogical Sciences of the USSR. The need to provide teachers with specific training in these areas was stressed, as well as their cooperation with the staff of health care facilities and professionals in medicine. The subjects which were the subject of the seminar should be taught within the framework of the course in human biology in the 8th class, but also elsewhere in the biology curriculum.

didactics of biology - biology instruction - human biology - health care education - hygiene - sex education - 8th class - seminar + teachers - USSR. 147313.

973. BAKHANOVA, G.I.:

Konferentsiya na temu "Rozvitie sel'skogo khozyaystva SSSR v 1986-1990 g.g." (A conference on the topic "The development of Soviet agriculture in the Ninth five-year plan")
Biologiya v shkole, 17, 1983, No. 4, pp. 65-67.

The author of the article, who is a village teacher, informs readers on the course of a conference organized within the framework of pupils' vocational guidance and the making of a vocational choice. The aim of this guidance is to guide pupils towards choosing an occupation in agriculture. The conference, in which a number of pupils presented the results of their work in biological subjects connected with agriculture, brought together pupils with the staff of local State Farms who provided information on the development of Soviet agriculture and the advantages of working there.

didactics of biology - biology instruction -
conference - vocation guidance - vocational choice
- agriculture - USSR. 147323.

574. ZICHÁČEK, V.:

Celostátní seminář metodiky biologie (A state-wide
seminar for specialists in the methodology of biology
teaching)

Přírodní vědy ve škole, 14, 1982-1983, No. 1, pp.10-11.

A state-wide seminar of specialist in the
methodology of biology instruction in our schools
who work in regional pedagogical institutes and at
Pedagogical Faculties was convened for facilitating
the implementation of the new concept of nature
studies instruction and biology in our schools. The
seminar took place from May 4th to 6th 1982 at Ládví
near Prague. Also the authors of textbooks and metho-
dological manuals, the staff of publishing houses and
of various journals participated. Among the problems
discussed was the way in which primary general edu-
cation, nature studies and later biology fit into
each other in basic schools, as well as problems of
the elective subject biological and chemical practical
exercises. Another topic was the further education
of teachers in connection with the new concept of bio-
logy education in general education secondary schools.

didactics of biology - biology instruction -
modernization - biological practical exercises -
seminar - new concept of education - Czechoslovakia.
147323.

14.9 Outstanding biology teachers, anniversaries, deaths

575. ABDULOV, K.:

Starshiy uchitel (An outstanding teacher)
Biologiya v shkole, 57, 1983, No. 4, p. 61.

The author acquaints readers with the educational work of a secondary school teacher from the Kulyabsk region of the Tadzhik SSR, called M.S. Rashidov and how use can be made of his experience. M.S. Rashidov regularly helps young teachers, who have little experience. He has also made an outstanding contribution to increasing the qualification of teachers.

didactics of biology - biology instruction - teacher - increasing qualification - USSR. 147315.

576. DABROWSKA-FROT, E.:

Wspomnienie o profesorze Kazimierze Petrusiewiczu. 1906-1982 (In memory of prof. Petrusiewicz 1906-1982)
Biologia w szkole, 14, 1983, No. 3, pp. 188-189.

At the occasion of the 1st anniversary of the death of prof. Petrusiewicz a commemorative meeting was held in Warsaw where the contribution of the deceased to organizing research was stressed. He was a long-term member of the Polish Academy of Sciences and its secretary, an outstanding ecologist and a professor at Warsaw University. His speciality were problems of population ecology and Darwinism. During World War II he fought as a member of a partisan unit. He was the organizer of the Ecological Institute of the Polish Academy of Sciences and was

active in Polish and international research efforts.

didactics of biology - outstanding zoologist -
ecologist - Poland. 147315.

577. Erwin Baur - Wegbereiter der Genetik (Erwin Baur -
a pioneer in genetics)

Biologie in der Schule, 12, 1983, No. 1, p. 41.

E. Baur was born in 1875 in Ichenheim. He first studied medicine and worked briefly as a physician, but from 1903 he began to work in botany, later as an assistant at the Botanical Institute in Berlin, where in 1904 he became an associate professor. Since 1911 he was a professor at the Agricultural University in Berlin; in 1914 he founded the Institute for the Study of Heredity where he later lectured on genetics. He became world famous through his genetic studies of flowers. He was very interested in practical cultivation problems and maintained contacts with Vavilov.

biology - outstanding botanist - outstanding geneticist -
GDR. 147363.

578. SILUK, T. - RAHADEKA, W. - FREJLAK, W.:

Stefania Figlarowicz - nie żyje (Stefania Figlarowicz
no longer lives)

Biologia w szkole, 12, 1983, No. 3, p. 314.

On August 22, 1982 S. Figlarowicz died. She was an outstanding educator and specialist in the didactics of biology from the Gdansk region. She devoted her whole life to schools and the development of didactics and she always cooperated with young people. Her work is assessed in detail. She was a bearer of the Golden Cross.

didactics of biology - specialist in didactics - Poland. 147305.

579. STAWIŃSKI, W.:

Wspomnienie o doktor Ludwinie Palce, 1940-1982

(In memory of Dr. Ludwinie Palce, 1940-1982)

Biologia w szkole, 36, 1983, No. 2, pp. 124-126.

Lit. 9, 1 fig.

L. Palce was born on March 19th, 1940; she studied in Wroclaw and Krakow where she received a doctor's degree in 1965. She became a member of the staff of the Institute of the Didactics of Biology and in 1975 published a book on learning basic terms in plant physiology. She is also the author of a number of textbooks and methodological handbooks.

didactics of biology - outstanding scholar - Poland. 147305.

15. Articles with scientific information concerning biology

580. ČECHOVÁ, A.:

Místři evoluce nebo alard ulička vývoje ? (Masters of evolution or a cul-de-sac of evolution ?)

Věda a technika mládeži, 37, 1983, No. 9, pp.266-267, 3 photographs, 2 figs.

There are 375 000 species of plants, which annually produce 130 billion tons of sugars. A special case are carnivorous plants which Charles Darwin once

called the masters of evolution. These plants produce a special sticky substance with which they trap insects or small animals and they are capable of disintegrating alien proteins and the aminoacids thus produced are then assimilated by the plant. These plants grow in swampy or acid soils and in this way they obtain from animals the phosphorous and nitrogen which they do not get from the soil. These plants have thus changed from producers into consumers. They provide testimony to the great adaptability of plants and animals to their environment. In the struggle for survival this development trend did not, however, become dominant and in fact represents a dead end in evolution, even if it is a successful one.

botany - carnivorous plants - evolution -
Czechoslovakia. 147355.

581. KOŠTÍK, V.:

Fotosyntéza - I (Photosynthesis I.)

Věda a technika mládeži, 17, 1963, No. 10, pp. 296.

The author discusses the problem of energy in relation to life. No organism on Earth can live without a constant supply of energy from the environment. Green plants make use of solar energy, carbon dioxide found in the air and water which together provide all that is necessary for the production of various organic compounds. In the cells of plants synthesis takes place, which transforms aminoacids into proteins or simple sugars into polysaccharides. The transformation of energy in

an organism is based on oxidation processes of which aerobic oxidation is the most economical. An important intermediate stage of energy transformation is the creation of ATP, which preserves free energy. The motor of all processes in the solar system is the sun. In the course of photosynthesis, plants bind only 2 to 10 % of the energy which comes to the planet Earth from the sun.

Biology - physiology - botany - photosynthesis -
Czechoslovakia. 147355.

582. KOŠTĚN, V.:

Fotosyntéza - 2 (Photosynthesis - 2)

Věda a technika mládeži, 17, 1963, No. 11, p. 326.

Organic phosphates are reservoirs of energy for living organisms, together with macro-energy compounds such as ATP, ADP and AMP, which make possible respiration and fermentation. ATP preserves and transports energy and is universal for all organisms regardless of the level of evolution they have attained. The inputs and outputs of these energy reservoirs for supplying living mechanisms, takes place according to the following formula:



Biology - physiology - botany - photosynthesis -
ATP - Czechoslovakia. 147355.

383. KOŠTÍŘ, V.:

Fotosyntéza - 3 (Photosynthesis - 3)

Věda a technika mládeži, 17, 1983, No. 12, pp. 360.
4 figs.

Here the author describes the formula for photosynthesis, the respiration process, the circulation of carbon, hydrogen and oxygen and explains the terms chloroplast and chlorophyll, their structure and function and the way in which light is absorbed.

Biology - physiology - botany - photosynthesis -
chlorophyll - circulation of matter - Czechoslovakia.
147355.

384. KOŠTÍŘ, V.:

Fotosyntéza - 4 (Photosynthesis - 4)

Věda a technika mládeži, 17, 1983, No. 13, pp. 392.
3 figs.

In this section of the series, the author explains the creation of elementary oxygen, the intermediary products of photosynthesis (R1HU - R1FO) and H₂O carriers. He describes in more detail the structure and function of chlorophyll a and b, the structure of chloroplasts and the excited state which is created by the absorption of a light quantum. Photosynthesizing cells function properly if they have at least 30 molecules of so-called quantum zones. Also phosphorylation and the transmission of electrons during phosphorylation are described.

Biology - physiology - botany - photosynthesis -
chlorophyll - chloroplast - phosphorylation -
Czechoslovakia. 147356.

585. KOŠTÍŘ, V.:

Fotosyntéza - 5 (Photosynthesis - 5)

Věda a technika mládeži, 17, 1963, No. 14, p. 424.

ATP and NADPH are very important for the synthesis of glucose and carbon oxides. The author describes the dark stage of photosynthesis or the Calvin cycle (Melvin Calvin received the Nobel Prize for this discovery in 1961). Mitochondria serve as fuel for obtaining energy from food.

biology - physiology - botany - photosynthesis -
ATP - mitochondria - Czechoslovakia. 147355.

586. ALTMANN, A.:

Morfogenní látky nazmara (Morphogenic substances in the Hydra)

Přírodní vědy ve škole, 14, 1962-1963, No. 7, p. 250.

Biologists have been successful in proving the presence of four different morphogenic substances in the Hydra which are important for regeneration, activating the head, inhibiting the head, activating the feet and inhibiting the feet. The effect of these substances is described in detail. The head activator can also be found in the brains of mammals, in the hypothalamus of rats and men, in concentrations which are much higher than in the Hydra.

biology - zoology - physiology - Coelenterata -
Czechoslovakia. 147355.

967. ALTMANN, A.:

Príklady vnútrodruhových komunikací u ryb. (An example of intraspecific communication among fish)
Přírodní vědy ve škole, 14, 1982-1983, No. 10, p.370.

The author describes the ethology of the fish *Beta splendens* HILAN 1909 from the Cichlidae family, of the order Perciformes. When young fish, several day old are observed, we see that the male care for the eggs and the young. When there is danger the male causes waves on the surface of the water with his pectoral fin. These waves cause excitation in the young and they react by swimming towards the source of the excitation; the male catches them into his mouth and brings them back to the safety of the fish nest.

biology - zoology - ethology - fish - intraspecific communication - Czechoslovakia, 147357.

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